WARTIME COLLEGE TRAINING PROGRAMS OF THE ARMED SERVICES

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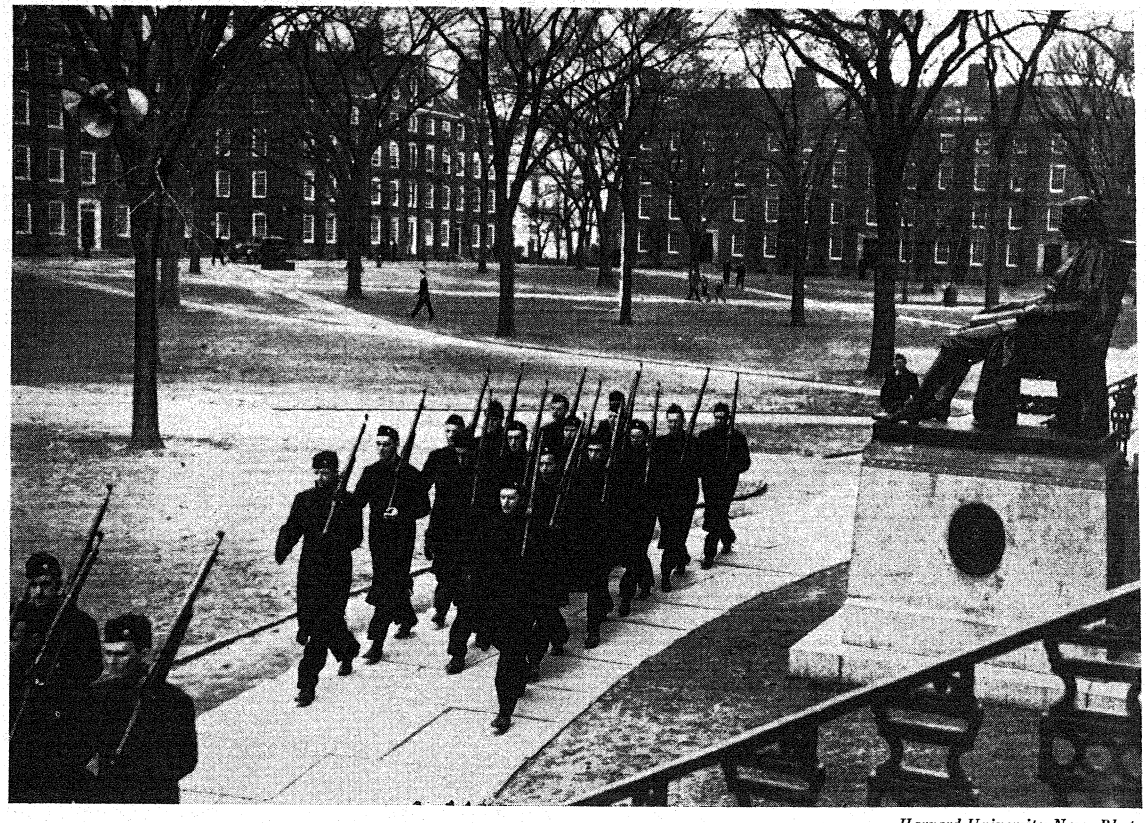

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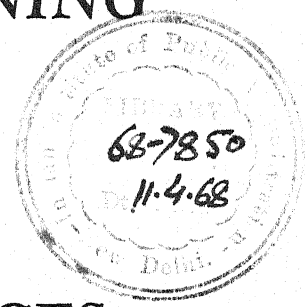
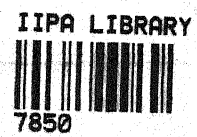
NAVY SUPPLY SCHOOL STUDENTS MARCH PAST THE STATUE OF JOHN HARVARD IN THE HARVARD YARD

WARTIME COLLEGE TRAINING PROGRAMS OF THE ARMED SERVICES





BY *Henry C. Herge*, WITH CHAPTERS ON SPECIA.
BY *Sidney L. Pressey, Harold Sprout, Gordon K. Chalmers, Raymond J. Connolly,* AND *Edward C. Elliott,* FOR THE COMMISSION ON IMPLICATIONS OF ARMED SERVICES EDUCATIONAL PROGRAMS

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FOREWORD

NO EDUCATIONAL INSTITUTION has ever possessed such facilities with which to do a job as the Army and Navy had for their programs during World War II. But neither has there been the need to do a job of such magnitude in such a short time. When there is a war to be won, the end becomes more important than the means to the end. Whatever methods or procedures would produce results were the ones used in the college training programs. There were no vested interests to prevent the scrapping of ineffective teaching procedures. There was little opportunity or desire to complain about instruction. Quality control was fundamental in the Navy, and in both services frequent evaluation of the results of learning and teaching were provided.

Except for certain areas which will be identified in this study, the armed services wisely left the academic phases of the program to civilian educators. Before certain programs were inaugurated, the military procured, either as civilian consultants or as training officers, thousands of men and women from our educational institutions. Through the combined efforts of the educators, who worked together and pooled their ideas on theory and practice, the training programs in colleges were evolved.

The methods employed by the armed services did not spring up full-blown during the war period. As the programs progressed, weaknesses were eliminated through suggestions from both the military and civilian educators. In particular instances there was constant supervision of instruction. This practice in itself was an innovation—at least in higher education. Suggestions for adapting certain procedures which had proved profitable in particular contract schools were frequently made and incorporated into the program. Academic freedom was in general maintained.

Emanating from the war training experience of our college and universities are important implications for higher education. It is not asserted that the methods employed were innovations or that they originated with the armed services. The establishment of training units of the armed services at approximately six

hundred American colleges and universities during the war provided the opportunity for these institutions to contribute directly to the war effort, and also provided unique opportunity for them to assess techniques and procedures employed in the programs for possible future use.

The Secretary of War and the Secretary of the Navy agreed to cooperate in the entire project of the Commission and facilitated its progress by designating as official liaison agencies, respectively, the Historical Division, War Department Special Staff, and the Standards and Curriculum Division, Training Activity, Bureau of Naval Personnel. These agencies provided full access to documentary materials and entree to numerous armed services headquarters and training installations.

The same agencies also reviewed the studies in manuscript, on occasion gave valuable suggestions, and finally approved the drafts as in accord with the safeguarding of information vital to the national security. Opinions and assertions contained in the studies are private ones of the authors and are not to be construed as official or as reflecting the views of the War Department or the Navy Department or of the military or naval services at large.

Dr. Herge conducted the research by studying the historical documents in the War and Navy Departments and also through visitation and observation of installations throughout the country during and following the war. As commanding officer of the Navy V-12 Unit at Wesleyan University during the war, he has had firsthand knowledge of the operation of these programs.

ALONZO G. GRACE
Director

December 1947

PREFACE

THE PRESENT study was initiated in October 1945. Encouragement was gained when the following statements were discovered in the then current educational literature:

> It would not seem to be part of open-minded educational statesmen, as we all aspire to be, to close the books on an experiment of the magnitude of the Army-Navy program of World War II without serious inquiry into its philosophy, its methods, and its lessons for the future . . . a program so vast as to give to our government the title of the greatest promoter of wartime higher education in the history of the world. . . . When many such impressions have been recorded and pooled, certain conclusions helpful for the guidance of peacetime education may emerge.[1]
>
> . . . . .
>
> But most of all, the Army and Navy programs have shaken the colleges and universities out of their conventional ways and their unreasoned resistance to change. The rigidity, even the smugness, is gone. The way is open for a reinterpretation of the traditional function of the college and university in terms that are appropriate to the second half of the twentieth century. That is no small blessing. The process has at times been painful, but let us give credit where credit is due.[2]

Since many of the training units were in operation at the time this study was begun, an itinerary was drawn up to interview many of the people who had played an important part in the war programs. Between September 15 and Christmas of 1945, the following campuses were visited: Yale, Coast Guard Academy, Massachusetts Institute of Technology, Harvard, Tufts, Dartmouth, Wesleyan University, Princeton, University of Pennsylvania, Carnegie Institute of Technology, University of Pittsburgh, Ohio State, University of Michigan, and the University of Chicago. Before joining the Commission staff and while an officer in the naval service, the author had the opportunity to visit the following schools and to observe the college training programs in action: Columbia, Trinity (Connecticut),

[1] Rev. Andrew C. Smith, C.S.J., "Lessons from a War Training Program," *National Catholic Educational Association Proceedings,* XLI (August 1944), 172.
[2] J. W. Nason, "What We Have Learned," *Journal of Higher Education,* XV (1944), 298.

University of Rochester, Cornell, Williams, and Amherst. Many of the opinions expressed throughout the book are those held by civilian faculty members on the campuses visited.

Following the interviews with faculties, the historical studies prepared by the War and Navy Departments were explored. This led to some valuable source materials wherein the Army and Navy had examined their own programs with a view to recording the lessons learned by experience. With all the source materials available it was soon discovered that it would be impossible to describe in detail all the armed services college training programs. It was learned that three types of programs were organized: (1) those offering instruction on the college level, (2) those in which the armed services supplied instruction and utilized only the physical facilities and housekeeping staffs of the institutions, and (3) those offering vocational instruction. It was decided to limit the scope of the study to the first category, in the belief that higher education gained more that is directly applicable and useful from this experience than from any other.

The scope of the study was further limited to the major training programs designed for specialized training of men in uniform on American college campuses. To most people, the armed services college training programs meant the Army Specialized Training Program (ASTP) and the Navy College Program (V-12). As a matter of fact, there were many other college programs, but the ASTP and the Navy V-12 program were the most significant in purpose, breadth of scope, major policies and practices, and numbers involved. They are therefore given the major attention here.

This report is organized in two parts The first consists of a condensed chronicle of how the tasks of institutions of higher education in World War II came to be assigned, how they were initiated, their scope and accomplishments, certain salient comparisons and contrasts between the Army and Navy college programs, somewhat detailed accounts of the principal undertakings of the three major services largely excerpted from the historical studies made by the services themselves and on file in their respective headquarters, and a brief review of the experience,

with statements of its lessons for the future of higher education. The second is composed of four chapters contributed by five persons having special competency in the aspects of higher education with which they respectively deal, and whose names and contributions are set forth here:

Sidney L. Pressey, professor of educational psychology, College of Education, Ohio State University—chapter vii, "Acceleration: Perspectives, Appraisals, Implications"

Harold Sprout, professor of politics, Princeton University—chapter viii, "Integration of Areas of Knowledge"

Gordon K. Chalmers, president of Kenyon College—chapter viii, "Integration of Areas of Knowledge." Dr. Chalmers' paper, originally prepared for the Commission on Liberal Education of the Association of American Colleges, was based upon wartime experience when he served as education consultant for the Army Air Forces

Major Raymond J. Connolly, chief of the Training Contracts Unit, Procurement Group, Army Service Forces—chapter ix, "Financial Aspects of the College Training Programs"

Edward C. Elliott, president emeritus of Purdue University—chapter x, "Effects of Wartime Research upon Institutions of Higher Learning."

ACKNOWLEDGMENTS

This study was initiated before many of the persons who guided the numerous college programs of the armed services during the war had been demobilized. The following Army officers were particularly helpful in providing ready access to official documents, histories, and files: Col. Francis M. Fitts, Lt. Col. Norman O. Wahlstrom, Maj. Henry L. Doten, Capt. Spaulding Rogers, Capt. Boyd C. Shafer, and Capt. Harold Underhill. In similar manner, valued assistance was afforded by the following officers of the Navy: Capt. A. John Bartky, Capt. Edward R. Durgin, Capt. L. Ensey, Capt. John C. Webb, Commander Raymond F. Howes, Lt. W. H. Conley, Lt. Edward Hodnett, and Lt. Russell H. Seibert.

Acknowledgments are also due to other officers of the wartime armed services who, in the line of their duties as historians, drafted accounts of the several college training programs and transmitted them to the headquarters of their respective services. From such accounts, the sections dealing with the Army Specialized Training Program, the Army Air Forces college programs, and the Navy V-12 program are largely extracted.

In providing opinions and statistics, the following persons were especially helpful: Francis G. Cornell, U. S. Office of Education; Benjamin Fine, education editor, *The New York Times;* and Guy E. Snavely, executive director, Association of American Colleges.

For critically reviewing the manuscript, the author is deeply indebted to each of the following persons, selected for his acquaintance with the subject matter and by virtue of the important role he played in the armed services training programs: A. S. Adams, provost, Cornell University; Francis J. Brown, staff associate, American Council on Education; Earl J. McGrath, dean, College of Liberal Arts, State University of Iowa; and John Dale Russell, director, Division of Higher Education, U. S. Office of Education.

On the numerous college campuses visited throughout the country, faculty members were most generous of their time when interviewed, as were the college and university presidents.

HENRY C. HERGE

October 1947

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Part One

THE WARTIME COLLEGE TRAINING PROGRAMS OF THE ARMED SERVICES

I. HOW HIGHER EDUCATION WENT TO WAR

EARLY IN 1939 the ominous clouds of war cast black shadows across the Atlantic upon the peace-loving people of America. Realizing the need for a more adequate national defense, President Roosevelt, on September 8, 1939, declared that a limited "national emergency" existed. As the "arsenal of democracy," the United States soon began to aid those European nations which were valiantly attempting to withstand the merciless onslaughts of the Fascist powers.

Our own lack of preparation and inability to wage a technological war became a matter of mounting concern throughout the nation. On January 6, 1941, President Roosevelt, in his address before a joint session of Congress, stated:

> We must all prepare to make the sacrifices that the emergency—as serious as war itself—demands. Whatever stands in the way of speed and efficiency in defense preparations must give way to the national need.

Shortly thereafter, much was being said in the press and over national radio systems of the military master plan for complete mobilization of the nation's manpower in industry. Blueprints were drawn, goals were set, and time schedules were established. Leaders in industry responded with one accord to the President's program, and the deficiencies in national defense soon began to take a different aspect. Munitions of war began to pour off the assembly lines.

ECHOES OF WORLD WAR I

The American Council on Education had come into being during World War I as the central agency for coordinating the efforts of higher education with the educational efforts of the federal government. The imminence of a second world-wide conflict in 1939 caused educational leaders to look again to the full-grown and representative American Council on Education for leadership. Unfortunately, many of these leaders had unhappy recollections of the Student Army Training Corps

(SATC) of 1918.[1] They wanted no repetition of that experiment, and hoped that the lessons learned would serve to guide in drafting a different plan.

The SATC was an armed services college program devised in the summer of 1917. It was intended to permit students under twenty-one years of age to be relieved from active military duty with the Army and Navy and to attend college for three years, during which time fundamental instruction was to be given in preparation for specialized jobs in the Army and Navy, leading eventually to commissions. The curriculum included fully prescribed courses in mechanical and electrical engineering. Navy students in the program, especially Navy deck candidates, were permitted considerable latitude. Before the first enrollees began their instruction in the 525 college units established, the Selective Service Act of September 1918 lowered the draft age to eighteen. Shortly thereafter the period of instruction for the student soldiers was reduced to a maximum of nine months.

The units were activated in early October, a month before the armistice was signed, and all trainees were demobilized by Christmas of 1918. This short time proved insufficient to permit smooth functioning of a program of such magnitude. Certain college officials believed that had the SATC continued, it would have demonstrated that many students, who would have been barred by the traditional methods of selection for college, would have been able to do superior work under the emergency plan.

Aware of the experiences of 1918, yet alert to the unusual demands that mechanized war might place upon American education for a continuous supply of technically trained personnel, a committee appointed by the American Council on Education in June 1940 published a statement entitled *Education and the National Defense,* which called the attention of the government

[1] An excellent review of this program and its parallel to the situation in 1941–42 can be found in "The Experiences of Higher Education in 1917–18" by Samuel P. Capen, in *Higher Education and the War* (Washington: American Council on Education, 1942). This is the report of a conference held in Baltimore, January 3–4, 1942, when approximately a thousand college officials met to discuss the role of the American colleges in the war.

to the recommendations of leaders in higher education. A few typical excerpts follow:[2]

. . . all the agencies of education must be utilized for the most effective meeting of any national emergency. . . .

Emergency programs should not interfere unduly with the regular work of the schools and higher institutions. . . .

An undue insistence upon regimentation of thought and action, including distortion of textbooks and other materials of instruction, and the uncritical use of materials of propaganda should be assiduously avoided.

. . . the responsibility for administrative control of the agencies of education [should] continue in the hands of the educational officers of the schools and the institutions of higher learning.

. . . a high quality of education [should] be insured by maintaining fully qualified personnel for administration, research, and instruction.

In August 1940 the American Council on Education and the National Education Association jointly created the National Committee on Education and Defense. Its subcommittee on military affairs periodically published a bulletin entitled *Higher Education and National Defense* through which the institutions of collegiate level were kept informed of the actions of government agencies and the Congress on matters pertaining to education.

SELECTIVE SERVICE ACT OF 1940

In the late summer of 1940, the Congress passed the Selective Service Act; on September 16 the President affixed his signature and it became a law. By it, every physically and mentally qualified male between the ages of twenty-one and thirty-six became subject to classification for induction and military training.

The concern of educators generally was centered in the fact that a substantial proportion of all male college students were within this age group affected by the draft law. The act, however, provided for the deferment of any bona fide college student until the close of the academic year 1940–41 if he should request this of his local board. This clause was inserted by Congress to permit a flow of trained personnel into the services, yet conserve the institutions which supplied the train-

[2] American Council on Education, *Education and the National Defense* (Washington: the Council, June 1940), pp. 11-12.

ing. A second provision of the law allowed additional deferments for those persons whose "employment in industry, agriculture, or other occupations or employment, or whose activities in other endeavors were found to be necessary to the maintenance of the national health, safety, or interest." It was because of the latter provision of the law that the regulations finally were modified to allow the deferment of the student who was "in training and preparation for an essential occupation." Twenty occupations and professions wherein personnel shortages existed formed the list that served to guide the Selective Service boards. Teachers of specified subjects and students training in such fields as engineering, medicine, dentistry, chemistry, and physics were among those who could be deferred. Consideration was given by local Selective Service boards to college students whose training or preparation in these specified fields could be officially established. However, opportunities offered for commissions and other specialized services caused many young men who might otherwise have continued their education as civilians to enlist.

The failure of higher education and the armed services to define jointly the function of colleges and universities during the period beginning September 8, 1939, when the limited "national emergency" was declared, until the spring of 1943, when the Army Specialized Training Program was launched, has well been called the period of uncertainty for higher education. True, constructive action was not entirely lacking. In the university laboratory, facilities and personnel were being employed for war research; the Reserve Officers' Training Corps was expanding rapidly; the National Roster of Scientific and Specialized Personnel, established in July 1940, was procuring comprehensive lists of competent persons in all fields of professional and specialized endeavor; and the Selective Service System was imposing its quotas of manpower needs for both the civilian and military phases of national defense.

EDUCATION TAKES THE INITIATIVE

Less than a month after the entry of the United States into the war, the most representative gathering of executives of the nation's colleges and universities ever convened met at Baltimore,

Maryland, in a conference sponsored jointly by the U. S. Office of Education and the National Committee on Education and Defense. There on January 3–4, 1942, the assembled delegates pledged the total resources of higher education to the war effort and pointed out the urgent need of specific plans for the utilization of the colleges and universities of the country in essential war training programs. Those plans, it was argued, should undertake:

(*a*) to determine the immediate needs of man power and woman power for the essential branches of national service—military, industrial, and civilian; (*b*) to determine the available facilities of colleges and universities to prepare students to meet these needs; and (*c*) to appraise the ultimate needs in professional personnel for long-time conflict and for the postwar period, in order that a continuous and adequate supply of men and women trained in technical and professional skills and in leadership to meet both immediate and long-range needs shall be maintained.[3]

Although, following this conference, college courses throughout the country were accelerated and a coordinated nation-wide effort was made to improve the physical stamina of all students under instruction, uncertainty continued as to the adoption of a plan for schools and colleges. Six months went by during which the only constructive actions taken were the creation of the War Manpower Commission under the President's Executive order of April 18, 1942, and the transmission to the chairman of WMC, in July 1942, of the report of a special committee of the U. S. Office of Education.[4] This report recommended that college student selectees be assigned to college in the same manner as they would have been assigned to an armed service, that they be paid a stipend, but that they continue in civilian status while in college. The report of this committee was not received with favor by the War Manpower Commission. Instead, WMC received and approved on August 19, 1942, a report of its own Special Committee on the Utilization of Colleges

[3] *Higher Education and the War,* p. 155.

[4] This committee, appointed by Commissioner of Education John W. Studebaker at the request of the War Manpower Commission, consisted of William H. Cowley, president of Hamilton College, *chairman;* Francis Bradshaw, dean, University of North Carolina; William T. Middlebrook, comptroller, University of Minnesota; and J. Lewis Morrill, president of the University of Wyoming.

and Universities for Purposes of the War.[5] In this committee the preferences of representatives of the armed services prevailed, and prominent in its report was the statement: "All able-bodied male students are destined for the armed forces. The responsibility for determining the specific training for such students is a function of the Army and the Navy."

Meantime, on July 15, 1942, the second Baltimore conference on higher education and the war convened. It went on record as reaffirming the resolutions of the January meeting and deplored the "lack of any adequate, coordinated plan for the most effective utilization of higher education toward the winning of the war."[6]

With the spreading of war to many and far-flung battle fronts, the needs of the armed services for additional personnel, particularly trained officers, became acute.

The American Council on Education appointed in August a Committee on the Relationships of Higher Education to the Federal Government, which held its first meeting August 31 and September 1 in Washington.[7] Throughout the fall, this committee was in constant touch with representatives of the Army and Navy with a view to the development of comprehensive war training programs. On October 14, 1942, the committee publicly recommended that a college training corps be set up to function in as many institutions as possible, consistent with the effectiveness of training, and that candidates for the corps be selected,

[5] This committee consisted of Edward C. Elliott, chief, Professional and Technical Employment and Training Division, WMC, *chairman;* G. H. Dorr, special assistant to the Secretary of War; Arthur S. Flemming, Civil Service Commission; James B. Forrestal, Under Secretary of the Navy; Major General Lewis B. Hershey, Selective Service System; and Wendell Lund, Labor Supply Division, War Production Board.

[6] "Second Baltimore Conference," *Higher Education and National Defense,* Bulletin No. 31 (July 24, 1942), American Council on Education.

[7] The chairman of this committee was Edmund E. Day, president of Cornell University. Other members were O. C. Carmichael, chancellor of Vanderbilt University; James B. Conant, president of Harvard University; W. H. Cowley, president of Hamilton College; Clarence A. Dykstra, president of the University of Wisconsin; Henry T. Heald, president of the Illinois Institute of Technology; Byron S. Hollinshead, president of Scranton-Keystone Junior College; Margaret S. Morris, dean of Pembroke College; F. D. Patterson, president of Tuskegee Institute; Robert G. Sproul, president of the University of California; Edward V. Stanford, president of Villanova College; Raymond Walters, president of the University of Cincinnati; and Roscoe L. West, president of the New Jersey State Teachers College.

inducted, put in uniform, on pay, and be under military discipline while in technical training for service with the armed forces. Within a short time it appeared that Navy plans were in almost complete accord with these proposals. Army plans, however, continued uncertain and in some respects apparently at variance with the proposals of the educators.

THE EMERGENCE OF AN OFFICIAL PLAN

On October 15, 1942, the President of the United States emphasized the need for action. In a letter to the Secretaries of War and the Navy, he wrote:

> Please have an immediate study made as to the highest utilization of American colleges. This is in view of the undoubted facts that the drafting of boys down to and including eighteen years old will greatly deplete all undergraduate enrollment. In addition to that, more and more young women are going into industry and the services. It may be advisable to call in the Association of American Colleges . . . and also a number of leading educators from state universities, large private universities, and the smaller colleges. There is an enormous amount of equipment in colleges—buildings, athletic fields, *et cetera,* which the Army and Navy may be able to use without great change.

Following the receipt of this letter by the War and Navy Departments, the American Council on Education was promptly called upon for suggestions in setting up advisory councils.[8]

It was shortly after this that a conflict arose between the War Manpower Commission and the armed services which did not intend to relinquish administrative jurisdiction of their military training programs. Four major responsibilities were involved: (1) control of contracts with institutions, (2) control of curriculum, (3) selection of institutions, and (4) training of spe-

[8] The Army Advisory Committee on ASTP originally consisted of six college presidents. Their major responsibility was the review and approval of the numerous curricula prepared. The members were Isaiah Bowman, Johns Hopkins University; Robert E. Doherty, Carnegie Institute of Technology, *chairman;* Clarence A. Dykstra, University of Wisconsin; Guy Stanton Ford (emeritus), University of Minnesota; Robert I. Gannon, Fordham University; and Ralph D. Hetzel, Pennsylvania State College.

The Navy College Program Policy Consultant Committee of civilian educators originally consisted of Frank L. Bowles, dean, Columbia University; Earl J. McGrath, dean, University of Buffalo; B. N. Dell, assistant dean, Princeton University; Elliott D. Smith, professor, Yale University; R. L. Stearns, president, University of Colorado; R. A. Kent, president, University of Louisville; and E. V. Stanford, president, Villanova College.

cialists to meet emergency civilian requirements. Settlement of the differences in the first three problems was finally accomplished by large concessions by the War Manpower Commission, under which a special joint committee of the WMC (consisting in major part of representatives of the Army and Navy) gave effect to the wishes of these branches of the armed services. In effect, the armed services were given sole responsibility for the administration of specialized training for any and all military purposes.

On December 5, 1942, the President of the United States issued Executive Order No. 9279 which had far-reaching consequences in that it placed the Selective Service System under the War Manpower Commission and transferred to its chairman the responsibility for mobilization and utilization of manpower. By this order, all voluntary enlistments between the ages of eighteen and thirty-eight were terminated. Section 6 of the order undertook to extend the War Manpower Commission's control of training programs utilizing college facilities. This significant section read as follows:

> The Secretary of War and the Secretary of the Navy shall take such steps as may be necessary to assure that all training programs for the armed forces (including their reserve components) and the Women's Army Auxiliary Corps, which are carried on in non-Federal educational institutions, conform with such policies or regulations as the Chairman, after consultation with the Secretary of War and the Secretary of the Navy, prescribes as necessary to insure efficient utilization of the nation's educational facilities and personnel for the effective prosecution of the war.[9]

This pronouncement once more raised the critical question of authority for supervision of curricula and the extent to which a civilian agency should direct the training of military personnel. The armed services were now prepared to announce their plans for the utilization of colleges and universities; however, upon

[9] To advise him in the execution of his responsibilities under this order, the chairman of the War Manpower Commission called upon an advisory committee consisting of the following members: Owen D. Young, General Electric Company, *chairman;* O. C. Carmichael, president, Vanderbilt University; James B. Conant, president, Harvard University; Edmund E. Day, president, Cornell University; Clarence A. Dykstra, president, University of Wisconsin; F. D. Patterson, president, Tuskegee Institute; Justice Wiley Rutledge, United States Supreme Court; Robert G. Sproul, president, University of California; E. V. Stanford, president, Villanova College; and William P. Tolley, chancellor, Syracuse University.

receipt of this executive order, announcement of plans was withheld until jurisdictional matters and regulations were agreed upon.

Although the two services had previously worked quite independently, on December 12, 1942, a joint letter signed by the Secretary of War and the Secretary of the Navy was received by the American Council on Education announcing the final plans for the utilization of the colleges and universities in war training. In general, the plans were similar to those originally suggested in the proposal of the Council's special committee which earlier had received the overwhelming support of the colleges and universities of the country. The differences between the plan proposed by the Council and the Army-Navy plan were most marked in the Army's section of it.[10] An illustration of a point in question was the insistence by the War Department that all trainees undergo basic military training before assignment to the college unit; the Navy Department, however, agreed with the Council's recommendation that students be inducted into college units direct from civil life and there receive basic military training along with other instruction.

The joint statement of the armed services asked for the use of colleges and universities to assist in the training of specialists. It established not only armed services policy, but also the machinery whereby young men would be selected by the respective services. In part, the statement read:

> With the demand of a mechanical war and of steadily growing armed forces, the Army, Navy, Marine Corps, and Coast Guard are in need of a flow into their respective services of large numbers of young men who require specialized, educational, technical training. Their own facilities of teaching staff and equipment are not sufficient for their needs. The colleges and universities will have such facilities available. Consequently, the armed services have together formulated plans to utilize for these needs to the maximum practicable extent the resources of these colleges and universities.

Once plans had been established for the selection of the participating institutions, each of the armed services announced

[10] For an account of the points of disagreement between the Council's committee and the military services see "How the Colleges Went to War," by George F. Zook, in *The Annals of The American Academy of Political and Social Science*, CCXXXI (January 1944), 5.

that the negotiations had been completed. The groundwork having been laid, the branches of the armed services launched their individual programs in the colleges selected for utilization.

In the case of the Army, training units were activated as promptly as possible, singly or in small groups. The first trainees reported to the first units for duty March 29, 1943, after which the activation of additional units proceeded during a period of several weeks. The Navy proceeded less hurriedly. It selected and prepared the institutions, then activated all units simultaneously on July 1, 1943.

FUTILE EFFORTS TO ESTABLISH ADDITIONAL PROGRAMS

In January 1943, Owen D. Young, chairman of the Committee on the Utilization of Colleges and Universities, submitted to the chairman of the War Manpower Commission a training plan designed to provide the armed services, the defense industries, and essential civilian and government agencies with an adequate supply of young men and women skilled in the technical and professional fields. Students were to be Army and Navy enlisted personnel and were to be assigned by the armed services in keeping with the needs of the various government agencies. For a while it appeared that the program would be approved and adopted; however, this proved finally not to be the case. The Army and Navy college training programs having been inaugurated, both services were reluctant to modify their plans or assume any responsibility whatever for training for civilian service, however essential it might be for the total war effort.

In the course of the year, two other unsuccessful attempts were made to establish programs which would permit students at the higher levels to retain their civilian status. The first was a scholarship plan "designed to encourage training in critical fields by offering federal scholarships to qualified students."[11] The proposal, submitted by W. W. Charters, director, WMC Bureau of Training, was entertained for a time but was finally withdrawn. The second proposal, introduced in the fall of 1943, was sponsored jointly by the U. S. Office of Education and the

[11] "The Official History of the Professional and Technical Division of the War Manpower Commission" (Washington: War Manpower Commission, 1945), p. 15.

War Manpower Commission. It, too, was based upon federal scholarships for civilian students. Early in 1944 the program was considered by the Bureau of the Budget, but it failed to win support.

EXTENT OF UTILIZATION OF FACILITIES

In the winter of 1943, after the utilization of colleges by the military had become an established fact, President Zook of the American Council on Education wrote:

> It might be assumed that two years after Pearl Harbor the colleges and universities, after many delays in arrangements with the War and Navy Departments, were at last fully immersed in the war effort.
>
> Such an assumption would be considerably short of the truth. In the first place, large numbers of institutions, including nearly all teachers' colleges, colleges for women, small liberal arts colleges, colleges for Negroes, and junior colleges, had no contracts for Army and Navy units.[12]

The total extent to which colleges and universities were utilized during the war (see Table 1) was disappointing to many administrators in view of the emphasis placed upon our being engaged in a total war and upon the need for trained personnel.

TABLE 1

NUMBERS OF INSTITUTIONS CLEARED FOR USE BY THE ARMED SERVICES

Cleared for Use by:	Number of Institutions
Army (exclusively)	122
Air Corps (exclusively)	155
Navy (exclusively)	148
Army and Air Corps (jointly)	87
Air Corps and Navy (jointly)	13
Army and Navy (jointly)	96*
Army, Navy, and Air Corps (jointly)	42
Total	663

* Of the 96 schools used jointly by the Army and the Navy, 83 were medical and dental schools in which contracts were negotiated on a tuition basis.

The total of 663 institutions represents only a little more than one-third of all colleges and universities, including junior colleges, existing in the United States; and only about half of the four-year, degree-granting institutions. Naturally the training was concentrated largely in the types of institutions having facil-

[12] Zook, *op. cit.*, p. 6.

ities for the particular courses of instruction needed. Only about 4 percent of the total of junior colleges of the country received approval for this purpose, and only about one-fifth of the accredited colleges, universities, and professional schools for the education of Negroes were utilized.

With the exception of engineering and medical schools, the institutions awarded contracts were, for the most part, those with sufficient facilities to house and feed large groups of men.

II. SIMILARITIES AND DIFFERENCES IN THE ARMY AND NAVY PROGRAMS

SELECTION of contract schools was the responsibility of the Joint Army, Navy, and War Manpower Commission Committee, which was established to determine the availability of facilities at colleges and universities and to allocate those selected equitably to the Army and Navy. This committee consisted of three members appointed by the Secretary of the Navy, three by the Secretary of War, and three by the chairman of the War Manpower Commission. In addition, there was the Joint Army-Navy Board for Training Unit Contracts, which was established "to insure that the terms and provisions of contracts . . . would be fair and uniform and that there would be no material differences in the standards applied by the two departments in their contract negotiations."[1]

SIMILARITIES IN ARMY AND NAVY PROGRAMS

The Army and Navy college training programs were similar in many respects. Both services contracted with the participating institutions on the basis of actual costs of instruction, use of facilities, subsistence of trainees, maintenance and operation, medical services, textbooks, and training equipment.

Students in these programs were selected on the basis of potential leadership and mental capacity. Those accepted were either screened military enlisted personnel or procured from civilian status through nation-wide testing programs. The student-soldiers and student-sailors were placed on active duty and were assigned to specific contract units. Trainees were put into uniform, indoctrinated (ASTP trainees received basic military training before assignment; V-12 trainees, while under instruction), paid the monthly base pay of enlisted men during the period of instruction, and were subject to such military discipline as the unit commanding officer prescribed.

[1] War Department, Army Service Forces, Headquarters, *Training Unit Contract Instructions for University and College Authorities Offering Training Facilities for Army Trainees,* Army Service Forces Manual M–102 (Washington: Government Printing Office, 1943), p. 4.

Both services emphasized scientific and technical subjects; both had prescribed curricula for fields of specialization; both had provision for screening students into advance phases and courses. The programs stressed physical fitness and military training in addition to the intensive and accelerated course schedules. Both programs utilized civilian faculties as provided by the contract institutions; however, responsibility for the administration of the program in each unit was divided between the commanding officer, who was responsible for finance, supply, military discipline, health, and welfare of the trainees, and the contractor, who was responsible for the academic phases of the programs.

Both ASTP and V-12 had their origin in existing Reserve programs. After the third semester of the ASTP, the War Department chose to abandon its advanced Reserve Officer Training Corps (ROTC) program. The Navy, however, continued its Navy Reserve Officer Training Corps (NROTC) program throughout the war at twenty-seven colleges and universities as an integral part of V-12 and as an upper-level specialty into which advanced V-12 trainees were screened. Thus, by absorbing its old V-1, V-5, and V-7 programs and by retaining the NROTC as the core of the new V-12 program, the Navy was able to initiate one distinct college program rather than operate several simultaneously.

DIFFERENCES BETWEEN ASTP AND V-12 PROGRAMS

At the inception of the ASTP and V-12 programs, both the Army and the Navy announced the intent of training specialists. The Navy program was established to provide a continuous flow of officer candidates, trained in the special fields anticipated as needed in the fleet. The demand schedules were set while fighting ships were still in the blueprint stage. The Army started its program with the idea that the ASTP would supply technical specialists who might later become eligible for officer-candidate school or serve as noncommissioned officers in all branches of the Army. It was not itself designed for officer candidates. Time proved, moreover, that relatively few of the ASTP enrollees were later admitted to officer-candidate school because (1) those

graduated from the program had to compete with all other enlisted men for selection to fill the limited quotas, and had gained little or no ground as a result of their ASTP experience; (2) by the time men completed the ASTP, the officer-candidate schools had already trained or admitted the majority of the officers needed by the Army; and (3) the Army critically needed young, physically fit replacements for combat duty. The primary function of the ASTP, therefore, became one designed to train enlisted men for responsibilities that entailed specialized assignments requiring special aptitudes and specific skills.

The exigencies of war affected the ASTP much more than they did the Navy program. In the planning stage of V-12, the naval officers responsible for policy-making agreed upon a long-range program. Since the Navy's officer personnel problems were less complex than those experienced by the Army, the Navy was able to gear its training of officer candidates to its program of ship construction. The Army, however, was faced with the need of filling an existing and constantly enlarging hiatus between its demand schedules and the evaporating pool of human resources of high caliber with young and healthy men. Thus, the War Department found that its need for particular types of trainees changed with combat needs in the theaters of war. Certain curricula had to be dropped; others were added; many were modified. Errors were experienced in establishing the ASTP demand schedules, and considerable difficulty arose in the assignment of graduates as the program developed.

The Army Ground Forces had particular difficulty because their desire for highly specialized personnel was not in keeping with their ability to use the men in their ASTP fields of specialization. In 1942 and 1943, the Army Ground Forces did not receive the same percentage of men of high intelligence and physical fitness as did the Army Air Forces and other services; and in 1944, at least when ground losses were mounting, they desperately needed such men as combat noncommissioned officers and infantry specialists. This situation, described in the following excerpt, explains in large measure the reason for the sudden curtailment of the ASTP:

The condition of the ground arms, especially of the infantry, was by this time causing alarm. Divisions had been stripped of their infantry privates to provide overseas replacements. Many of these same divisions were scheduled for early movement for impending invasion of Western Europe. They had to be refilled with men already basically trained. The War Department judged also that the quality of enlisted men in the infantry must be raised. General Marshall on February 10, 1944, informed the Secretary of War that 134,000 men already basically trained were required for the coming operations in France, and that "the outstanding difficulty currently noted in our divisions is the number of non-commissioned officers who are below satisfactory standards of intelligence and qualities of leadership." He recommended withdrawal of all but 30,000 trainees from ASTP, offering the Secretary of War the alternative of cutting ASTP or of disbanding 10 divisions, 3 tank battalions, and 26 anti-aircraft battalions.

ASTP was immediately liquidated. A large number of its trainees, almost overnight, became privates in the infantry. They had to start as privates because most units, with their former privates withdrawn as overseas replacements, had at least a full complement and sometimes a surplus of non-commissioned officers. It was expected and desired that the ASTP trainees would show their superiority over the older non-commissioned officers, win the ratings, and become leaders of small units.[2]

A direct contrast to this situation occurred in the Navy college training program which, from its origin, was designed to be an officer-training program in the colleges and as such to present the least possible interference with established procedures, courses, and campus traditions. The sincerity of this intent was expressed by the Chief of Naval Personnel, who, before the inception of V-12, highlighted its purpose at the first nation-wide Columbia conference in the spring of 1943:

> This is a college program. We desire . . . to preserve the normal pattern of college life. . . . We desire our students to have the benefits of faculty counseling, of extracurricular activities—in short, the best undergraduate education the colleges can offer.[3]

In the development of its program, the Navy adopted the standard college sixteen-week term with trainees permitted to

[2] War Department, Army Ground Forces, "Qualitative Problems of Enlisted Personnel in the Army Ground Forces," in "History of the Army Ground Forces," No. 5 (MS on file in Training History Section, Historical Division, War Department Special Staff), p. 48.

[3] Navy Department, Bureau of Naval Personnel, *Conference on the Navy V-12 Program at Columbia University, May 14–16,* NavPers 15012 (1943), p. 4.

enroll with civilian students in established courses that met requirements. The Army's decision was to use the shortest time in which a satisfactory curriculum could be prescribed, a twelve-week term. These terms were combined into a basic program and a series of advanced programs. The starting dates at the Army contract schools varied in that some units were activated on March 1, others on April 1, and still others on May 1, 1943. In this way, the Army was able to assign trainees as they became available at induction centers or through replacement training centers—a system in contrast to the Navy system of a new increment every four months. The ASTP basic program consisted of three twelve-week terms with most of the entering students undergoing the same instruction in classes reserved for trainees. Variations occurred in the second and third terms, depending upon the interests and abilities of the individual men. Those who qualified for advanced work were, at the conclusion of the basic program, screened into specialized fields where the work was also on a twelve-week basis and the number of terms depended upon the field in which the soldier was specializing.

In contrast, the Navy allowed its men with advanced academic standing, classified "irregular," to continue their education in the fields of their majors, except for certain prescribed courses, and to remain under instruction for a period in keeping with the sliding scale of allotted terms. Only incoming freshmen, classified as "regular," were required to take a fully prescribed V-12 course of study. All successful naval trainees were permitted to state their preferences as to institutions to which they desired to be assigned, and these preferences were respected to the degree with which it was administratively possible to comply. The V-12 trainees were also permitted to express their choices of preliminary course of study and to specify the branch of naval service they desired; however, their assignments were contingent upon established quotas and competence in their particular fields at the time of graduation. To a degree, this was also true in the ASTP, but transportation and available assignments were controlling factors in the situation.

The Army defined its program in terms of "contact hours,"

with a ratio between contact and study hours differing from those established in civilian schedules. Fifty-nine hours of supervised activity a week was the average work load of an ASTP trainee, divided as follows: 24 hours (minimum) classroom and laboratory work; 24 hours required study; 5 hours military instruction; and 6 hours physical instruction. The Navy required each V-12 student to carry a minimum of 17 academic credit hours of work in addition to physical training, military duties, and drill. The Army and Navy programs both were geared to consume 50 to 60 hours of concentrated effort each week, with no respite except for a few days between terms. In this respect, they were accelerated and much more intensive than the normal civilian schedule.

The language requirements in the two programs also differed. The Navy language courses were the traditional college courses that existed at any of the contract units and were elective except in the prescribed curricula for NROTC, premedical, predental, and prechaplain candidates. The Army, however, introduced its special area and language curricula organized for intensive instruction.

In general, each ASTP unit became an Army college within each contract institution. This is stated succinctly in the following excerpt from the history of the Army Specialized Training Program:

> The ASTD regarded the testing program as an indispensable part of the training program. It insisted upon objective uniform examinations in order that it might have means of evaluating the training contracted for, with some 200 colleges. In order to assure nation-wide uniform academic standards, it was necessary that the control over their standards be maintained by the ASTP. The program of national examinations, the program of inspections, and the program of academic visitations were among the means of assuring national standards. Certain restrictions on the size of classes, on methods of instruction, on the ratio of contact hours to class hours, were directed by the ASTD, and inspection trips were made and reports scrutinized to insure adherence to them.[4]

The origins of the Navy V-12 curricula and the bases upon

[4] War Department, Army Service Forces, "A History of the Army Specialized Training Program" (MS on file in Historical Division, War Department Special Staff), p. 79.

which they were established created quite a different situation in the contract schools. This is brought out in the Navy training history:

The principles that were followed in the preparation of the curricula were largely evolved from practices that were recognized as sound in colleges and universities. The first two terms' work furnished a common core of studies which it was believed all naval officers should include as part of their college education. This core consisted of work in mathematics, English, history, physics, engineering drawing, naval organization, and physical education, which formed the basis for more advanced work. The upper-level work was specialized in nature and was determined by the type of duty for which the man was being prepared. Descriptions, which were in no sense detailed prescriptions, were prepared for all these courses. It was necessary that common minimum requirements be stipulated since students were trained in different colleges and sometimes transferred from one to another. The descriptions merely guaranteed that the same general content would be covered by all trainees. The curricula that were prescribed met with such a high degree of success that few changes ever had to be made. The college world was particularly happy about the freedom they were permitted within the broad curricular outlines. Had the course outlines been too rigid, the intellectual enthusiasm of both faculty and students would have suffered to the prejudice of an effective educational experience. As the program was administered, on the other hand, each institution was free to utilize most effectively the resources at its disposal without fear of bureaucratic meddling. Throughout the history of the entire program the Training Division was, if anything, more anxious to protect the freedom of the colleges to control academic matters than were the colleges and universities themselves. Certainly no policy could have been better devised to win the wholehearted cooperation of the contract institutions.

Without any doubt the factor most responsible for the success of V-12 was the liberal policy followed in the administration of the academic program. The colleges suffered no regimentation and never felt themselves to be puppets controlled by strings in the hands of bureaucrats unacquainted with their problems. Testing, scheduling of classes, counseling of students, methods of instruction, and academic standards were left in their hands with good results. Effective teaching requires enthusiasm on the part of the instructor, and that can only be obtained when he is largely free to apply his own imagination and intelligence to his art. If colleges are well selected, the competency of the instructional staff must be assumed until there is proof to the contrary. Likewise the interest and cooperation of the college administrative officials arose from their confidence in the value of the program, from the belief that the Navy would deal fairly with them on contractual matters, and from their awareness that the Navy was keeping them

informed of all developments in the program which would affect their interests.[5]

Whether this Navy account is completely unbiased or reflects accurately the opinions of administrators in participating institutions is not challenged here. There is, however, consistent evidence that the Navy Department policy was one which aimed at noninterference with custom and tradition and at the maintenance of academic freedom at the contract schools.

[5] Navy Department, Bureau of Naval Personnel, History Project, "History of the Navy College Training Programs" (MS on file in Office of Naval History, Navy Department), p. 81.

III. THE ARMY SPECIALIZED TRAINING PROGRAMS

IN REPORTING upon the sources of manpower, General Marshall wrote:

When we had planned the size of the Army it had been impossible to foresee all of the ways in which the circumstances of waging three-dimensional war over the world would drain our manpower. . . . Since the nature and technique of war, if not the fundamentals, are ever-changing, it is impossible to forecast casualties in one war from the experience of past ones. . . .

Some of the forecasts were accurate; others were not. An exact forecast of the rate of ground force attrition had to be tied directly to the effectiveness of such factors as aerial bombardment, artillery, enemy morale, enemy fighting ability, and a myriad others that defied long-range calculation. As the war progressed we learned, by unceasing study of the experience we were gaining daily, what to expect in specific situations.[1]

In anticipation of this manpower crisis, particularly in the fields requiring technically and professionally trained men, the War Department favored a coordinated college training program.

TRANSITIONAL PROGRAMS

Before the inception of the ASTP, the War Department was sponsoring the AAF program on cadet status, the Enlisted Reserve Corps, and the Reserve Officer Training Corps. The programs already in existence were considered to be inadequate in their ability to produce technically trained personnel in the numbers required. As was the case in the Navy, the War Department formulated plans for the absorption of existing programs by the new. The War Department's account of this transition and of the systematic plan evolved by the Army Specialized Training Division to assure a flow of trained men follows:

When the ASTP was established, a considerable number of men were in separate Army college training programs. One group was in the AAF program, on cadet status. One group in the ERC, on inactive status, was

[1] Gen. George C. Marshall, Chief of Staff of the United States Army, *Biennial Report to the Secretary of War, July 1, 1943, to June 30, 1945*, p. 103.

being trained for the Signal Corps. Other groups, also in the ERC, had been left on inactive status to continue training they had begun as civilians. Various Army agencies had detailed personnel (enlisted men and officers) for training in various colleges.

These various training programs were administered, without adequate coordination, by different War Department agencies, in accordance with different plans. The contracts between the government and the institutions were not uniform. Institutions were selected on different principles. No uniform standards or levels of instruction had been established. The several programs were not coordinated with one another or with the Navy college training programs. The establishment and development of the ASTP did not end the confusion that resulted from so many uncoordinated programs, but it lessened it greatly. If the establishment of the ASTP had been directed earlier, the confusion might not have developed.[2]

Provisions were necessary to assure that the training these men had already had would be utilized and to assure that there would be no discrimination against them. It would have been discriminatory to require them to continue their training at their own expense or to deprive them of the opportunity for training. Accordingly the Joint Army-Navy Statement of December 12, 1942, provided special treatment of such personnel, as indicated in the following synopsis:

Medical and dental students in ERC were to be called to active duty at the end of the first full term beginning in 1943 and were to be detailed to continue their studies.

Medical, dental or veterinary students commissioned in the MAC were given the privilege of resigning their commissions and enlisting as privates for detail to continue their studies.

Premedical students in the ERC were to be called to active duty at the end of the first full term beginning in 1943. Those selected for ASTP at induction or at the completion of their military training were to be detailed to continue their studies.

Medical and premedical students not in ERC, if inducted through Selective Service, were to be placed on inactive duty until the end of the first full term beginning in 1943 and were then to be called to active duty. Thereafter they might be assigned to ASTP for further medical or premedical training or to other military duty.

Senior (fourth year) ROTC students, including members of ERC were to be ordered to active duty on graduation or on completion of the first full

[2] War Department, Army Service Forces, "A History of the Army Specialized Training Program" (MS on file in Historical Division, War Department Special Staff), pp. 165–66.

term beginning in 1943, whichever was earlier. They were to be assigned upon beginning active duty to their respective branch Officer Candidate Schools.

Junior (third year) students in the ERC who were pursuing approved technical engineering courses were to be called to active duty at the end of the first full term beginning in 1943. Those selected at the end of Basic Military Training for further technical training were to be detailed to the ASTP for that training.

Junior (third year) technical students not in ERC, if inducted through Selective Service, were to be placed on inactive duty until the end of the first full term beginning in 1943 and were then to be called to active duty. . . .

At the completion of their Basic Military Training, those selected for further technical training were to be detailed to the ASTP for that training. All other members of the ERC were to be called to active duty at the end of the then current semester. Upon completion of Basic Military Training, they were eligible for assignment to ASTP or to other military duty.

It is not to be assumed that the decision by the War Department to absorb the ERC and the ROTC within the ASTP was done because of their weaknesses in training. Without the Reserve programs and the officers produced during the peacetime period before 1941, the Army would have had a dearth of trained leaders. Of this General Bres wrote:

During World War II, the Officers Reserve Corps, composed largely of graduates of the ROTC, furnished over 200,000 officers to the Army of the United States. On V-J Day, these officers, in grades from lieutenant to lieutenant general, formed a vital part of our victorious armies. In every division and in every staff, including the highest staff levels, Reserve officers held key positions.[3]

By March 1942, the Army had called 93,000 ROTC officers to active duty, and they outnumbered Regulars almost three to one. "Just what we could have done in the first phases of our mobilization and training without these men, I do not know," General Marshall admitted in his final report as chief of staff.

Of the 159,853 men who were actually commissioned upon completing the four-year college course since 1919, 100,000 saw active duty. Their war record was good. So was that of ROTC men who had not won their commissions in college. Studies made of OCS classes showed that men with

[3] Brig. Gen. Edward S. Bres, "Reserves Are the Backbone of Peace," *Army Day Review*, April 6, 1946, p. 50.

some ROTC training did as much as 30 per cent better than others. And an Army survey of five typical combat divisions revealed that two out of every three battalion and company commanders were ROTC men. One-third of the divisions' officers were ROTC trained.[4]

INCEPTION OF THE ASTP

In the War Department, the Army Specialized Training Division (ASTD) was created in compliance with Army Service Forces Circular 95, dated December 18, 1942. This circular directed that the division be established under the cognizance of the Commanding General, Services of Supply, to implement the ASTP.[5]

On February 18, 1943, ASF Circular 11 directed that in each of the nine Service Commands and the Military District of Washington there be established an Army Specialized Training Branch, which was to operate under the Personnel Division. These branches were given authority for "supervision of *all* activities pertaining to the Army Specialized Training units operating within their respective Service Commands."

In the relatively short period between the creation of the ASTD on December 18, 1942, and March 29, 1943, when the first trainees began to arrive at the contract schools, the administrative machinery for launching the new program was effected. This mammoth task entailed such problems as activation of participating units, curriculum construction, assignment of administrative personnel, testing of candidates by screening boards, establishment of demand schedules, and many other major and minor details.

The initial quota of 150,000 trainees was established by the commanding generals of the Army Ground Forces, Army Service Forces, and Army Air Forces. At its inception, more than 200,000 enlisted men in the armed forces, scattered within the continental limits, evinced interest in the program. By the time the candidates had been processed by screening boards, the first

[4] *Newsweek,* March 18, 1946.

[5] The ASTD was under the jurisdiction of Lt. Gen. Brehon B. Somervell, with staff supervision assigned to Brig. Gen. Joe N. Dalton, director of personnel, and with Col. Herman Beukema assigned as director of the division. A. L. H. Rubin served throughout the war as special consultant to the director.

input was below the quota set. In consequence, General George C. Marshall, chief of staff, in a letter to the commanding generals of the AGF, ASF, and AAF, requested the wholehearted cooperation of every echelon to insure the success of the program. His letter, released April 1, 1943, was as follows:

The Army has been increasingly handicapped by a shortage of men possessing desirable combinations of intelligence, aptitude, education and training in fields such as medicine, engineering, languages, science, mathematics, and psychology, who are qualified for service as officers of the Army. With the establishment of the minimum Selctive Service age at 18, the Army was compelled to assure itself that there would be no interruption in the flow of professionally and technically trained men who have hitherto been provided in regular increments by American colleges and universities.

The Army Specialized Training Program was established to supply the needs of the Army for such men. The objective of the program is to give specialized technical training to soldiers on active duty for certain Army tasks for which its own training facilities are insufficient in extent or character. To that end the Army has contracted with selected colleges and universities for the use of their facilities and faculties in effecting such training of selected soldiers in courses prescribed by the Army.

Successful graduates of the program will be immediately available to attend Officer Candidate Schools and technical schools of all the arms and services. The Army Specialized Training Program is not earmarked for any particular arm, service, or component. Graduates will be assigned according to need in the same manner newly inducted men entering the Army are classified and assigned, primarily on the basis of pre-induction skills or professions. The program is Army-wide in scope.

The number of eligible men recommended for training under the Army Specialized Training Program has been disappointing. I desire that every echelon of command support this program and make it a success. I desire further that proper action be taken by you to insure that all in your command are informed of these facts and of the need for wholehearted cooperation.

Upon receipt of this letter in the field there was a renewed interest that resulted in a rapid increase in the number of men processed and in the successive monthly quotas. The ASTP became fully effective in mid-June 1943, when the regular twelve-week term of instruction was inaugurated. The program reached its peak in December 1943, when 135,629 soldiers were in training at 202 colleges and universities.

SELECTION FOR THE ASTP

The most comprehensive study[6] on the Army Specialized Training Program is that which was made by the Historical Division of the War Department. It is this description from which the following sections are borrowed by permission:

The Organization for the Selection of ASTP Trainees. Several different organizations and procedures were employed to screen men for ASTP training. At the very beginning of the program it was hoped that Field Selection Boards like those established for the selection of officer candidates would be adequate for the purpose. When it proved otherwise, Specialized Training Assignment and Reclassification (STAR) units were established. Provisions were also made for screening by Classification, Training and Selection (CT & S) Sections at Reception Centers and Training Centers.

Field Selection Boards. The Joint Statement of the Secretaries of the War and Navy Departments prescribed that, except for members of the ROTC and ERC, the selection of ASTP trainees was to follow the general plan for the selection of enlisted men for Officer Candidate School (OCS). This prescription implied the use of Field Selection Boards, and was the first indication to the field of the screening procedures to be utilized for the selection of ASTP trainees. On December 26, 1942, a statement of general qualifications required for ASTP was published.

More specific provisions for the selecting and processing of men eligible for ASTP were published on February 19, 1943. At this time each commander with authority to appoint an OCS Board . . . was directed to appoint an ASTP Selection Board. . . . If practicable, at least one member of the board was to be a classification officer (or a personnel consultant if no classification officer was available) and at least one member of the board was to possess training and experience in the field of education at the college level.

. . . ASTP Selection Boards were directed to secure Personal Data Forms for eligible enlisted men, to conduct personal interviews, and to administer a prescribed examination prepared for the purpose. Completed personal data forms were forwarded to the appropriate Service Command headquarters, where they were consolidated. Reports were then forwarded to The Adjutant General (TAG). TAG forwarded consolidated reports to the Director, ASTP, who assigned quotas and requested TAG to issue the necessary order of designated enlisted men to appropriate institutions. Orders transferring men assigned to ASTP were issued by Service Command headquarters in accordance with instructions furnished by TAG.

[6] War Department, Army Service Forces, "A History of the Army Specialized Training Program." From this source the remainder of the present section is largely excerpted, though its parts are not always in the same order as in the original.

STAR Units. The selection of men generally qualified for assignment to the ASTP was not difficult; but the designation of the proper curriculum and term for the thousands of men in the Army who had had previous college training was an extremely difficult and complex problem of classification and assignment. It became apparent early that this problem was beyond the capacities of ASTP Field Selection Boards. Specialized Training Assignment and Reclassification (STAR) units were established to "train, test, classify, and assign" ASTP trainees certified by Field Selection Boards to be generally qualified for the ASTP. Final selection of men for the ASTP and designation of the curricula and terms to which they were to be assigned ceased to be functions of the Field Selection Boards, which thereafter passed only upon general qualifications for ASTP training. Their screening was restricted to securing the information required by the Personal Data Form and to the conduct of interviews.

Further testing, screening, and processing became the function of the STAR units, fifteen of which were established on April 2, 1943. The first trainees were scheduled to arrive on April 6, 1943. The contracts establishing STAR units at designated colleges made them responsible for housing, messing, medical care, testing, classification, and such instruction in particular subjects in the ASTP basic and engineering curricula, and physical training, as the tests and classifications given each trainee at the institution indicated that he needed and as his time at the institution permitted.

On April 9, 1943, explicit instructions were published governing the operation of STAR units, including definition of their function, . . . selection boards, and the personnel to be assigned to them. Seventeen STAR units were in operation by April 9, 1943. When the ASTP was curtailed in March, 1944, the number was cut to three. All others were discontinued before April 1, 1944; the remaining three, as of June 20, 1944. This was practicable because of the decision of June 12, 1944, to restrict screening for the ASTP to reception centers and the decision of June 11, 1944, to assign men earmarked for the ASTP to designated Infantry Replacement Training Centers (IRTC's), in which CT & S sections were established to perform the functions of STAR units.

Instructional Operations. ASF Manual M-108 lists the curricula[7] according to which ASTP instruction was given and indicates the date on which instruction began and ended in each curriculum, the weekly schedules, the terms and courses included in each curriculum, and brief descriptions of each course.

Programs of instruction in the ASTP were formulated by the ASTP to meet the expressed needs of the arms and services. The curricula were prepared in consultation with subject-matter specialists who were nominated

[7] War Department, Army Service Forces, Headquarters, *Catalog of ASTP Curricula and Courses, Army Specialized Training Program,* Army Service Forces Manual M–108 (Washington: Government Printing Office, 1945).

by the American Council on Education. Upon completion, major curricula were submitted to the ASTP Advisory Committee of distinguished educators nominated by the American Council on Education and the United States Office of Education. This committee gave them careful review, recommended certain revisions, and certified them to be of collegiate quality. The completed curricula were submitted for concurrence to the arms and services interested in procuring personnel trained in them.

Programs of instruction were under constant review and were revised from time to time in the light of the ASTD's experience, in the light of the recommendations of educators working with the curricula in AST units, or to meet changed training requirements. Important revisions were undertaken in consultation with the subject-matter specialists recommended by the American Council on Education and were submitted to the ASTP Advisory Committee.

FORMULATION OF THE CURRICULA

1. *Basic Phase Curricula.* The subject-matter specialists who recommended the content and the sequence of courses in the Basic Phase Curricula were limited in their efforts by certain conditions. The trainees were to be better than average graduates of American high schools or were to have begun college work. They were to be given essential knowledge and skills in fields which were designated but only broadly defined. The time available was limited to three terms of 12 weeks each. The curriculum was to serve in the first two terms as common preparation for advanced training in engineering, and in medicine and dentistry. The curriculum was to be a complete educational unit in itself in order that it might properly be terminal for some trainees.

Since the program was to be intensive, adjustments to make training more leisurely in one course could have been made only at the expense of other courses. The sequence of courses established by the educators consulted was the best that they could devise within the limiting conditions. Subsequent experience showed the sequence to be practicable.

2. *Advanced Phase Engineering Curricula.* The subject-matter specialists who recommended the content and sequence of courses in the Advanced Phase Engineering curricula, like those consulted in the formulation of the Basic Phase curricula, were limited by certain conditions. In particular, trainees assigned to the Advanced Phase Engineering curricula were to have completed successfully the work of Basic Phase Curriculum BE-1 or its equivalent in civilian education; they were to be given knowledge and skills, more or less definitely specified, in designated engineering specializations. The time available was limited to three terms for most specializations and to four terms for others. It was expected that the successful completion of the three terms of Basic Phase Curriculum BE-1 (or its equivalent) and three or four terms of an Advanced Phase Engineering curriculum would

result in knowledge and skills warranting the assignment of graduates to engineering tasks.

3. *Special Advanced Phase Engineering Curricula.* As men were screened for assignment to the ASTP, it became apparent that there was a considerable number of high caliber men available in the Army who, despite the fact that they had had previous college work in mathematics and physics, were not qualified to proceed immediately to Term 4 of an Advanced Phase Civil, Electrical, or Mechanical Engineering curriculum. Curriculum 4A was devised to meet the needs of these men. Under its provisions, institutions were requested to arrange courses to meet the needs of particular trainees in such a way as to fill the *lacuna* of their previous training and thus to qualify them in a single term for the work of Term 4 in the regular Advanced Phase Engineering curricula.

Other special curricula were devised to develop special engineering skills not requiring three terms.

4. *Advanced Phase Foreign Area and Language Curricula.* The Advanced Phase Foreign Area and Language curricula were formulated in accordance with the same procedure as that followed in formulating the other ASTP curricula. Consultants included distinguished linguists, geographers, political scientists, and other subject-matter specialists nominated by the American Council on Education. The ASTD also worked in close cooperation with the chairman of the Intensive Language Program of the American Council of Learned Societies. The first Foreign Area and Language curriculum, No. 705, published March 22, 1943, was prepared to meet the particular needs of the Provost Marshal General's Office (PMGO), since the original demand for such training came from that office. Consequently, in preparing the curriculum, the ASTD not only consulted civilian specialists outside the War Department, but also worked in close cooperation with a representative of PMGO, Training Branch. The languages and areas in which instruction was to be given and the first institutions to be utilized were also determined in close collaboration with the PMGO. The initial correspondence with the first institutions considered for the program was carried on by that office.

The subject-matter specialists who recommended the content and sequence of course in the Foreign Area and Language curricula, like those consulted in the formulation of the other curricula, were limited by certain conditions. In particular, the trainees were to have had previous college training; they were to have prior knowledge of at least one modern foreign language; they were to retain their skill in that language and achieve speaking knowledge of another; they were to achieve knowledge and understanding of the people and institutions of the area in which the language they studied is spoken; they were to achieve knowledge of the natural resources and developed facilities of that area and of the principles of

police science and law enforcement. The time available for training was two terms of 12 weeks each.

5. *Special Advanced Phase Foreign Area and Language Curricula.* A special one-term curriculum (Curriculum G-2, Term 9L), comparable to Advanced Phase Engineering Curriculum G-1, was formulated to locate men possessed of a high degree of fluency in a modern foreign language and knowledge of the area in which that language is spoken and to provide for them refresher training that would assure their maximum usefulness to the Army. Enlisted men who had knowledge and skills equivalent to or beyond the scope of the work of the highest term of any regular ASTP Foreign Area and Language curriculum were assigned to Curriculum 0-2. Under the provisions of this curriculum, institutions arranged courses to fit the needs of particular trainees, or assigned them to appropriate civilian courses, to assure the military applicability of their skills. A special one-term (Term 4L) curriculum, No. 72, was devised for men fluent in a foreign language but not having the educational background or knowledge of a foreign area necessary to qualify for Term 9L. A special course in Japanese (Special Term 4, Japanese Translators) was designed to prepare men for further special training in a Signal Corps school and ultimate special assignment in the Signal Corps. No curriculum was published. This course differed from other ASTP language courses in that it placed its emphasis upon the ability to read and write the foreign language studied rather than on the ability to speak it.

6. *Personnel Psychology Curriculum.* The Advanced Phase curriculum in Personnel Psychology, Curriculum No. 600, two terms, was formulated in accordance with the same procedures followed in the formulation of the other curricula, by specialists in the field. The curriculum was for trainees who had had previous college training in psychology. They were to be given intensive instruction in the specific aspects of psychology that are essential to the performance of specific personnel functions of the AGD.

7. *Physical Training and Military Training.* Physical training and military training were concurrent with academic training in all ASTP curricula.[8]

8. *Pre-Professional and Professional Curricula (Medical, Dental and Veterinary).* In the fields of medicine, dentistry, and veterinary medicine, the object of Army college training could be attained only if the soldier, upon completion of the prescribed Army curriculum, could, by virtue of his college instruction, be utilized by the Army as an officer. Therefore, since graduation from a professional school approved by the War Department was essential for a commission in the Medical, Dental, and Veterinary

[8] War Department, *Physical Training Program for Army Specialized Training Program (ASTP Trainees and ASTRP Students),* ASF Manual M–106 (Washington: War Department, 1944); War Department, *Military Training Program for Army Specialized Training Program,* ASF Manual M–107 (Washington: War Department, 1944).

Corps of the Army, the objective of ASTP training in these fields was necessarily the successful completion of the curricula established by the approved schools themselves for the granting of the degrees of Doctor of Medicine, Dentistry, or Veterinary Medicine.

Accordingly, the content of these professional curricula for the training of enlisted men under the ASTP was not modified by the War Department. Nor was it necessary to prescribe the length of the courses . . . since the approved schools had themselves, prior to the establishment of the Army and the Navy college program, adopted a program of accelerated instruction.

Contracts entered into by the War Department for instruction . . . merely stipulated that . . . these institutions follow the contractor's standard curriculum under the accelerated program recommended by the national association of which it was a member. Although not so stipulated, it was requested that class or clinical instruction be maintained throughout 48 weeks of each calendar year since not over 30 days' annual furlough could routinely be granted to Army trainees.

Pre-Medical, Pre-Dental, and Pre-Veterinary Curricula. The modifications introduced by the Army in the instruction prerequisite to the study of medicine, dentistry, or veterinary medicine were, on the other hand, quite radical and comparable to those adopted in other fields of ASTP instruction. . . . The prerequisites to admission for the study of medicine were a minimum of two years of college preparatory work during which satisfactory courses of instruction in English, physics, biology, and general and organic chemistry had been creditably completed. Three years of college were recommended. A number of medical schools required four years of college preparation; a few required the degree of Bachelor of Arts or that of Bachelor of Science.

. . . The college associations recommended to the member colleges that as a contribution to the war effort qualified applicants for professional studies be accepted for matriculation who met the minimum prerequisites only. The way had thus fortunately been prepared for the subsequent formulation of a pre-medical curriculum by the ASTP which would, in the minimum time, satisfy the common prerequisites for admission to the study of medicine, dentistry, and veterinary medicine in those American schools whose facilities the Army desired to utilize in its specialized training program. . . .

The decision of the War Department to compress the pre-medical instruction into a period of 60 weeks (five ASTP terms) was the subject of considerable controversy with the Association of American Medical Colleges, which contended that the curriculum was over-accelerated: it would result in the physical and mental exhaustion of the pre-medical student, and, above all, precluded the desired "maturation" so essential for the study of medicine. However, if pre-professional trainees were to follow a daily, weekly, and term schedule of instruction comparable to that adopted

for other ASTP curricula, and if the prerequisite courses could be completed satisfactorily in five terms of such instruction, the War Department did not feel that it was justified in adding a sixth term. Sixty weeks of ASTP instruction was considered to be at least the equivalent of 64 weeks (two academic years) of traditional collegiate work under peacetime conditions. . . .

Under the ASTP no enlisted man was assigned for instruction in pre-professional subjects . . . unless it had been determined that he was acceptable, from the point of view of academic competency and of personal qualities, for the ultimate study of medicine, dentistry, or veterinary medicine, and for a commission in the appropriate corps for service as an officer of the Army of the United States.

This selection for ultimate professional studies was to be effected by the careful screening of candidates for the study of medicine and dentistry (no additional selection was made for veterinary medicine) among enlisted men who were successfully completing the second or third term of the ASTP Basic Curriculum, and among enlisted men at large who had completed a minimum of one year of appropriate college work before entering the Army. . . . The first two terms of the Basic curriculum were thus a necessary and integral part of the pre-medical–pre-dental programs.

SELECTION AND SCREENING INTO ADVANCED PHASES

The initial selection of enlisted men for training in medicine, dentistry, and veterinary medicine under the ASTP was a simple blanket confirmation of the previous action of the contracting school by which the individual had been admitted to or continued in its standard curriculum. Similar approval of the school's acceptances of enlisted men for 1943 and 1944 entering freshman classes was considered an adequate selection procedure for enlisted men in this category.

The selection of the enlisted men who would be assigned for instruction in the vacancies reserved for the War Department in 1945, and thereafter, was, however, a more elaborate and exhaustive procedure. These candidates were designated for the study of medicine or dentistry from among trainees already enrolled in the Basic Curriculum (B-1), and transferred to the Pre-Professional Curriculum (P-1) for the completion of their pre-medical–pre-dental prerequisites. This was accomplished by the classification of candidates completing Term 2 and Term 3 of the Basic Curriculum by means of a preliminary screening test of the objective type known as the Aptitude Test for Medical Professions, and a subsequent interview of the candidates who achieved a qualifying score on this sheet. . . .

The Aptitude Test for Medical Professions was utilized primarily as an instrument to limit the number of candidates who each month would be presented to unit classification boards and to medical and dental interviewers for classification and recommendation. The announcement of a

critical score each month permitted the designation in each unit of a suitable number of candidates to be interviewed. The number, in the months that this screening was operative, was three times the desired number to be selected for transfer to the pre-professional curriculum.

Representatives of the contracting medical and dental schools within each Service Command served as expert consultants and as members of AST unit classification boards for the purpose of conducting these interviews. These medical and dental interviewers advised the classification board, to which all scholastic and other personal data were made available, whether the candidate was acceptable and qualified for the ultimate study of medicine and dentistry. This was expressed as one of four categories: fully qualified and acceptable; acceptable but not of the highest qualifications; acceptable; or not satisfactory and not acceptable. . . .

The results of classification were reported to Headquarters, Army Service Forces, three weeks prior to the completion of the term then current and orders for transfer for continuation of ASTP training in the professional curriculum were issued by TAGO. . . .

These screening and selection procedures were based on the selection of candidates for professional training, not for instruction in a specific medical or dental school but for the study of medicine or dentistry at large. It is admitted that the criteria of normal peacetime selection of civilian students for medical and dental studies vary widely—as do the qualifications of the applicants. Certain well-known medical and dental schools attract many of the best qualified applicants. The admission standards of these schools doubtlessly are more rigid than those of other schools of local rather than national reputation. The selection procedures adopted for the ASTP may have necessitated the lowering of the sights of a few admission officers who served as medical or dental interviewers; they also, it is felt, caused the raising of the sights of others whose judgment may previously have been influenced by financial, personal, or political influences.

Because of the advisability of a possible revision of selection made before the demonstration of competency in biology and in organic chemistry, a second screening was directed in the second month of the final terms of the pre-professional curriculum (Term 5). This second screening, made after the termination of the training of pre-dental trainees, resulted in an elimination from the program of 173 enlisted men, 7.2% of the 2,401 previously selected for training in medicine. Since only trainees with good academic records were presented to the medical interviewers in Term 5, this revision of the initial selection emphasized the lack of common criteria for the study of medicine among medical educators. It also emphasized the difficulty of the operation of procedures which were so at variance with the usual peacetime and civilian methods of acceptance for the study of medicine by means of "bilateral selection"—the mutual choice of school by the student and student by the school. . . .

ASSIGNMENT TO AST UNITS FOR TRAINING IN MEDICINE

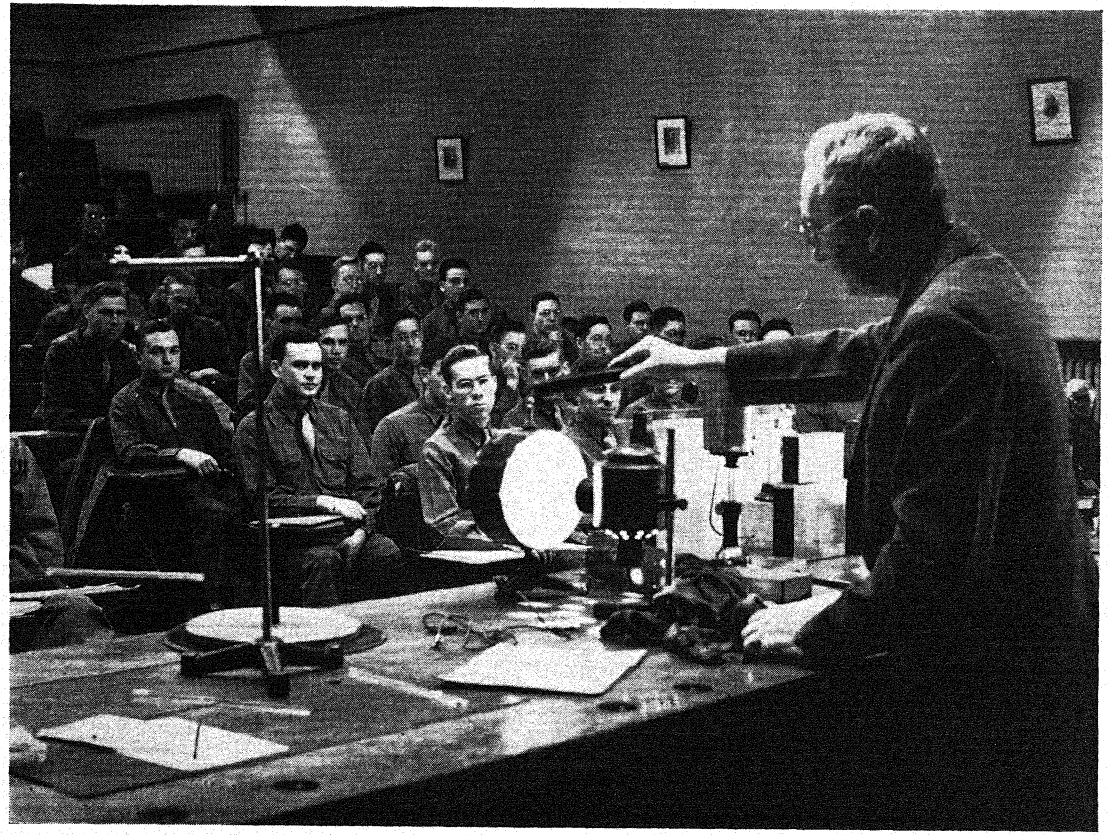
On July 1, 1943, the deans of the contracting schools of medicine, dentistry, and veterinary medicine were informed, in a letter from the Director, ASTD, that the assignment of enlisted men to AST units at their schools for professional instruction in Army-reserved vacancies would be by number rather than by name. While undoubtedly desirable, it was not considered administratively possible to permit the trainee to choose the school nor the school to choose the trainee assigned by the War Department. At that time, the prospective procedure met with widespread and almost universal opposition from medical educators. The deans advanced a multitude of reasons why they must personally select the individual whom they had contracted to train, reasons varying from the alleged peculiar standards of the institution to the desire to train only sons of taxpayers of the particular state. Numerous schemes were examined for "bilateral selection." None was considered practicable. . . .

The first group of enlisted men selected for training in medicine through the screening procedures previously described completed their pre-medical studies on October 29, 1944; the bulk of the remainder on December 2 and 30, 1944. A small number (27) whose training had been interrupted remained under instruction, grouped in one unit, until April 28, 1945. These graduates were designated for transfer to AST units at contracting medical schools, for actual movement after varying periods of interim duties, as follows: (1) The names of graduates were arranged alphabetically on four lists prepared by the commandant, representing the first, second, third, and fourth quarters of the class according to academic standing; (2) These lists were forwarded to the service command, and the trainees designated therefrom, in equal numbers in each quarter, for transfer as directed by the Commanding General, Army Service Forces (School Division, Office of the Director of Military Training); (3) Headquarters Army Service Forces thus effected the equal and anonymous distribution of qualified trainees to the contracting schools, as wide a distribution as practicable being made of the graduates reported from each pre-medical unit.

CIVILIAN REACTIONS

Some General Criticisms of ASTP Curricula Received from Participating Institutions. The workload imposed upon ASTP trainees by the requirements of the curriculum and by the inclusion in their weekly schedule of six hours of physical training and five hours of military training was much heavier than that normal in American colleges even in wartime accelerated programs. In addition, there were other (necessary and unnecessary) interruptions of the trainees' class and study time by the military. It was not always possible to arrange for the routine military calls (e.g., pay call, mail call, sick call, inspections) so as not to interfere with class

PLATE I



State University of Iowa Photo

A Demonstration in Electro-static Electricity for a Class of ASTP Trainees at the State University

PLATE II

University of Michigan News Photo

A WARTIME CLASS IN THE PERSIAN LANGUAGE OFFERED IN THE ASTP AT THE UNIVERSITY OF MICHIGAN

or study time. In addition, a few commandants were slow to understand that time for such formations as Retreat was to be deducted from the time for military training if the formations were required. College faculties, on the other hand, were slow to realize that ASTP trainees were soldiers, not students. They believed that trainees should have leisure comparable to that usually at a student's disposal. They spoke with some nostalgic feeling of the peacetime academic convention requiring two hours of study time for each hour of class time. They made frequent recommendations that the program be lightened by the omission of physical and military training or by the lightening of the whole program and the provision for additional terms. As the program continued, however, some educators came to the view that the ASTP had demonstrated the ability of selected students to do more work than is conventional among undergraduates. Most educators retained some doubts, however, as to the effectiveness with which learning can be assimilated and retained under so accelerated a program.

Rigid Curricula. Related to criticisms of the workload imposed upon trainees was the frequent criticism that ASTP curricula generally made no provision for the free election of courses by the trainee. Trainees were assigned without option to all the courses of the term and curriculum in which they were enrolled. This was criticized as unrealistic, as an attempt to put square pegs into round holes. It was attacked as undemocratic and contrary to the traditions of American education. As the program progressed, however, some few educators reported that one of the great contributions of the ASTP lay in its calling to the attention of educators the advantages to the student of a fixed curriculum. If it is possible in civilian education to allow students to make up their own medley of unrelated courses and ignore whole groups of related subjects, it was necessary in the Army program to insist upon less wasteful utilization of time even at the cost of requiring trainees weak in necessary subjects to study them.

Faculty Workload. The same objections that were made with respect to the workload of trainees were made with respect to the faculty workload. College faculties are accustomed to long week-ends and long summers in which to refresh themselves and pursue their private academic interests. They are accustomed to encouragement in research and regard their private study as a professional duty expected of them by their employers. When they are asked to prepare new courses, to accept heavier teaching schedules, to teach larger classes, and to give up their long vacations, they are not pleased. Although they protested that their peacetime summer work as scholars was part of the duty for which they were normally paid, they expected and received under the ASTP extra remuneration for teaching during the summer quarter. They often did not understand that if the ASTP teaching was the only service for which they were employed, the

War Department could not continue the subsidy of their research to which they were accustomed.

Administrative Difficulties. When there were administrative difficulties in AST units, they resulted most frequently from a failure on the part of the academic and the military authorities to understand the exact limits of their responsibilities, which were necessarily overlapping. In a very few institutions, it was necessary to change either the civilian coordinator or the commandant. Fewer than a dozen such cases required the attention of the Division, in a program involving several hundred civilian coordinators and over 200 commandants. This remarkable record suggests that in taking precautions to define the respective responsibilities of civilian and military authorities, the War Department learned at least one lesson from the history of the Student Army Training Corps of World War I.

Institutions in which AST units were established faced other difficulties than those resulting from the division of responsibility between the academic and military authorities. The annual report of the president of one participating institution includes the following statement on the subject, which may be taken as representative of other institutions as well:

> "The operation of the Army Specialized Training Program was attended by many difficulties and problems. Some of them were as follows: The management of an Army program whose cycles were not synchronized with the semesters in the civilian program; the retraining of the teaching staff to give instruction in the Army program; the shifting of staff members from one college to another; the alteration of dormitories to house the trainees; the curtailment of health service to civilian students because of a depleted medical staff and limited hospital facilities; additional loads of clerical work in administrative offices with depleted clerical personnel.
>
> Since the requirements of the Army in respect to sanitation, health, housing, messing, classroom procedure, records and reports were different, and in certain respects more exacting than for the usual civilian program, the year has been strenuous indeed for all members of the University staff."

Some institutions found the adjustments necessary to meet the difficulties described above almost beyond them. Examination of their reports of the program indicated great concern for what must be regarded as nonessentials. Others, taking these adjustments in their stride, gave their entire attention to the training problem, and found it stimulating. The coordinator of one unit reports that:

> "The AST Program had several valuable lessons for the University and its faculty. First among these was perhaps the value of a fixed and intelligently chosen curriculum. This has many advantages

over the system of electivism that has run wild in our modern education. The solid content is assured. The faculty (or Army) experience prescribes more widely for students than their own experimentation. Floating, indecision, lost time and choice of courses on extrinsic motives are avoided."

An administrator in another unit writes as follows of the program:

"Relatively clear aims, relatively high concentration upon them, democratic opportunity for all—these are the great virtues of the Army program. All these provide contrasts with our peacetime educational program."

ATTRITION STATISTICS

In the absence of any complete War Department study of the causes and rate of attrition in the ASTP from its inception to termination, the following is a summary of the available statistics.

For the terms ending June 1943 through June 1945, the number of trainees separated for all causes including graduation from ASTP, excluding USMAP and ROTC, in the cyclical program (basic, engineering, area and language, preprofessional, and personnel psychology) was 141,213, of whom 26,888, or 19 percent, were separated at the end of the term for academic failure. In the ASTRP (basic, engineering, premedical, area and language), during the same period, 23,984 were separated for various reasons. Of this number, 7,946, or 33.1 percent, were academic failures. In the noncyclical program (medical, dental, veterinary), in the same time period, 20,407 were separated for numerous reasons including graduation, as above. Of this number, 1,291, or 6.3 percent, were separated for academic weakness. The grand total of separation in all curricula and for all reasons, including graduation, for this period was 185,604, of whom 19.5 percent were academic failures. This last figure also excludes USMAP and ROTC.[9]

In addition to those separated for academic reasons at the end of the term, some students were separated for various causes before the end of a term. If this is also considered, the total

[9] War Department, Army Service Forces, School Division, Planning Branch, Statistics Section, *Summary of ASTP Production Reports* (Mimeographed; Washington: War Department, Army Service Forces, July 31, 1945).

percentage of failure may well reach as high as 25 percent. The percentage of attrition materially decreased in the more advanced phases of the program as the students became more and more a selective and smaller group. For example, it was estimated that if 100 trainees began the first term of the advanced phase curriculum, 6 would be lost. Of the remaining 94 entering the second term, 5.6 would be lost. Of the 88.4 entering the third and final term, 5.3 would be lost. Therefore, of the original 100 who began the first term, a total of 16.9 would be separated, which would result in an attrition rate for the advanced curriculum of approximately 17 percent.

Another statistical summary, issued seven months later than the one just discussed, and covering a period of different length, is condensed in Table 2.

TABLE 2

ARMY SPECIALIZED TRAINING PROGRAM TRAINEE FLOW BY CURRICULUM, APRIL 1943 THROUGH DECEMBER 1945 *

Curriculum	Entered	Graduated	Separated
Advanced program, cyclical	150,375†	41,933	104,157
Advanced program, noncyclical (medical, dental, and veterinary)	29,208	13,121	8,369
Reserve, ASTRP	28,526	9,466	17,898
ROTC program	8,566	8,566	.....
USMAP preparatory program	2,510	2,068	30
Total	219,185‡	75,154	130,454

* An over-all summary condensed from tables prepared by the Statistics Section, Planning Branch, School Division, ASF, March 5, 1946.
† Includes ASTRP, August 1943 to January 1944, inclusive. Separate data not available.
‡ Approximately 14,000 students continued under instruction in January 1946.

AUXILIARY ENTERPRISES

In addition to the regular specialized college training, ASTP, there were three special groups under the jurisdiction of the director of ASTD. They were: the Army Specialized Training Reserve Program (ASTRP), the program for Candidates of the United States Military Academy (USMAP), and the Program for Soldiers with First-Year Advanced ROTC Training. A brief description of each of these college programs follows.

ARMY SPECIALIZED TRAINING RESERVE PROGRAM (ASTRP)[10]

The primary purpose of this program was to reduce the training time allotted to enlisted men in the ASTP by creating a reservoir of young men with some college training before they had become eligible for Selective Service. Young men, seventeen-year-old high school graduates, who were found qualified for the program were granted military scholarships and were sent to contract institutions. They were placed on inactive duty, in a hybrid Army uniform, and received no pay or allowances. Their transportation, tuition, textbooks, subsistence, housing, and medical care were provided at government expense. Under this scholarship arrangement, Reservists were given instruction in the ASTP basic phase courses.

Undoubtedly, one motivating factor in the War Department's creation of the ASTRP was to provide a means for the Army to "tap" young men before induction, inasmuch as the competition between the armed services for manpower was acute. Each of the services was attempting to attract high caliber personnel and to hold them in reserve until a future need arose. It became apparent that this competition resulted in an interservices conflict, and in a useless waste of human resources which indirectly contributed to the disillusionment of many trainees in the Army and Navy programs. From the beginning, the Navy V-5 and V-12 college training programs and the AAF Aircrew Training had a strong attraction for the seventeen- to twenty-year-old high school graduates; in consequence, its supply of candidates was usually much greater than the periodic input quotas allowed. With the creation of the ASTRP, the Army also gained an entree into the seventeen-year-old group, and selected young men were permitted to continue their training uninterruptedly during a war-created period of uncertainty that all high school graduates faced: whether to await the draft, whether to seek employment, whether to attend college, or

[10] This account is largely excerpted and rearranged from two sources: (1) "History of the ASTRP" (MS on file in Historical Division, War Department Special Staff); (2) War Department, Army Service Forces, Army Specialized Training Division, *Essential Facts about the Army Specialized Training Program* (Mimeographed; Washington: Government Printing Office, 1943), pp. 14–17.

whether to enlist promptly with parents' permission. By qualifying for the ASTRP, Reservists began immediately their preparation for the most advanced military duties they were able to perform.

Those chosen for the program were required to be of college caliber. It was planned that from this group would come the high-grade technicians, specialists, and candidates for OCS to meet the needs of the various arms and services.

Selection techniques

A maximum quota of 25,000 Reservists at any time was authorized by the War Department. This number was in addition to the quota of 150,000 set for the number of soldiers participating in the ASTP at any one time.

In general, candidates for the ASTRP were required: to have had a high school education or its equivalent; to be seventeen years old and not have reached their eighteenth birthday prior to entering the program; to have passed the A-12 Pre-induction Test; to be voluntarily enrolled in the Enlisted Reserve Corps; to meet physical requirements for general service; and to designate Army preference.

The mental qualifying examination was a combination aptitude and achievement test that was administered by the AAF examining boards. For a period Reservists were procured through the Joint Army-Navy Qualifying Tests for Civilians. These tests were given periodically at any high school, preparatory school, or college in the country attended by students who desired to take the tests. Applicants who were successful and who were also found physically qualified were required to enlist in the Enlisted Reserve Corps (ERC), unassigned, for ASTRP, or in the Air Corps Enlisted Reserve (ACER), for the ASTRP, if they specified Army.

Inauguration of the program

The ASTRP was initiated at a number of colleges and universities on August 9, 1943. The Reservists began their instruction in the basic phase courses, including English, history, geography, sciences, and mathematics. All Reservists who had

completed one or more terms of college before entering the ASTRP were assigned to the most advanced training for which they were qualified. In the program, the workload was similar to that of the regular ASTP trainees. There were approximately fifty-four hours of supervised activity in the total work week, consisting of twenty-four hours of classroom and laboratory work, twenty-four hours of required study, and six hours of physical training. In addition, students who were assigned to instruction at ROTC units were required to receive basic ROTC training. Their programs were slightly modified from that of the regular ASTP trainees. The term of instruction was twelve weeks, with an interval of one week between terms.

Academic achievement

Trainees were required to maintain academic standards sufficiently high to justify their selection and retention as holders of military scholarships. They were advanced as their progress warranted and as the faculties of the institutions determined. Standardized achievement tests were administered from time to time to determine standards attained.

Military training

Unlike the ASTP trainee, the Reservist did not receive his basic military training before entering ASTRP. At the conclusion of the term in which the Reservist reached his eighteenth birthday, he was placed on active military duty and ordered to an Army replacement training center for the prescribed basic military training. Upon completion of this training, he was screened for continuation in the ASTP, and, if found qualified, he was assigned to a particular field of study at an ASTP unit.

PROGRAM FOR WEST POINT CANDIDATES (USMAP)[11]

The primary purpose in establishing this wartime program was to provide an opportunity for worthy enlisted men and

[11] War Department, Army Service Forces, Army Specialized Training Division, *Essential Facts about the Army Specialized Training Program,* pp. 17–18. Also, "History of USMAP" (MS on file in Historical Division, War Department Special Staff).

officers in the Army to qualify for entrance into the United States Military Academy at West Point.

Personnel in the Army who held letters of appointment to the United States Military Academy at West Point were permitted to receive special preparation in courses administered by the ASTD. Those eligible for this training included enlisted men in the Army who held letters of appointment, whether as principal, alternate, or competitor, issued by the War Department with a view to admission to the Academy; candidates from the United States at large (presidential appointees); and candidates with congressional appointments.

Candidates serving in the Navy, the Marine Corps, and the Coast Guard were eligible for discharge from those services upon their request, and were permitted to enlist in the Army for the purpose of receiving the preparatory training. In addition to holding an appointment, each candidate had to meet the physical requirements for entrance to West Point.

Course of training

The USMAP curriculum was drafted by the Academic Board of the Military Academy. Contract institutions in the program included Cornell University, Lafayette College, and Amherst College, where the instruction was given by the regular civilian faculties.

The course of training was divided into two phases, the first of which consisted of two twelve-week terms in preparation for the entrance examinations, and the second of which was one fifteen-week term, consisting largely of subjects prescribed for cadets in their plebe year. This latter phase was limited to candidates who had been found academically qualified for entrance to the Academy.

PROGRAM FOR SOLDIERS WITH FIRST-YEAR ADVANCED ROTC TRAINING [12]

Soldiers who had completed the first year advanced ROTC work at college during 1943, and prior to entering active duty

[12] This account is a rearrangement of material in *Essential Facts about the Army Specialized Training Program*, pp. 18–19.

in the Army, were sent to STAR units upon completion of their basic military training. Those who scored a minimum of 110 in the AGCT (the minimum required for admission to OCS) were sent from the STAR unit to an AST unit where ROTC instruction of their arm or service was available. Wherever possible, they were returned to their former college.

Academic instruction

The academic instruction under the ASTP for these special students was designed to assure their development toward maximum utility to the arm or service with which they were identified. Those who had a background in college engineering resumed academic instruction along the lines of the ASTP curriculum in engineering. All others received instruction to prepare them for their particular assignment, and also to fill any gaps in the following minimum requirements, all at college level: one and a half years of mathematics, one year of chemistry, two years of English, one year of American history, one year of geography, and foreign languages (various).

Work schedule

The work week for these men consisted of eighteen to twenty-two hours of classroom instruction, an approximately equal number of hours of study, six hours of physical training, and not more than thirteen hours of military training, with five hours spent in classroom work and drill. Military training was along the lines of the second-year advanced ROTC course of the arm or service in which the trainee had received his previous ROTC work. The soldiers received training as assistant instructors, administrative assistants, and the like. Performance standards in academic instruction were identical with those of the ASTP.

IV. THE TRAINING PROGRAMS OF THE ARMY AIR FORCES

THE Army Air Forces utilized civilian colleges for three distinct training programs: (1) the aircrew training detachments, or "pre-preflight schools," operated in a total of 153 institutions during the calendar year 1943 and the first half of 1944; (2) the training of cadets in meteorology, begun in five universities in the fall of 1940 and continued; and (3) the pre-meteorology courses, operated in some twenty-six institutions in 1943 and early 1944. In addition, the facilities of a few colleges and universities were used for other relatively small programs, among which were the statistical officer-candidate school, and college units for training in engineering, armament, communications, and photography. During the first nine months of 1943 a program was operated in a few institutions for the training of administrative and technical clerks.

PRE-PREFLIGHT SCHOOL[1]

In 1943 a major change was introduced in the sequence of air-crew training with the introduction of a five-month "pre-preflight" program. For a little more than a year most aviation cadets received the first stage of their air-crew training in civilian colleges. Ostensibly the purpose of the college training program was to give students adequate preparation for the intensive ground training of the preflight schools. The expansion of flying training objectives from a peacetime quota of only a few hundred graduates a year to approximately 70,000 was fast draining off the cream of the available manpower. Consequently, by 1943 a large number of the men who had qualified for aviation cadet training were deficient in the necessary fundamentals, particularly mathematics and physics.

Another and perhaps more vital factor in the hasty inauguration of this pre-preflight program was an embarrassing personnel problem. By December, 1942, a backlog of approximately 90,000 men had been built up in the Air Corps Enlisted Reserve, and many of these men had been awaiting a call to duty for six or seven months. A college training program was suggested as a method of protecting this valuable pool from the draft boards (the Navy) and the War Manpower Commission and of retraining them for future use by the AAF.

[1] Excerpted by permission from *AAF College Training Program,* pp. 1–23 (MS on file in Historical Division, War Department Special Staff).

The small colleges lent eager support to such a project. Most of the larger schools were already in use by the Navy or were committed to the ASTP. Hundreds of smaller institutions, suffering seriously from loss of students, saw in the proposal perhaps a last opportunity to retain their teachers and to maintain their facilities.

This college program, suggested in December, 1942, was adopted by the middle of the following January. In addition to academic, military, and physical training, students were to receive 10 hours of dual flight training. (That the personnel problem was of greater motivating significance than the value of this training is indicated in the delegation of responsibility for the program to the A-1 rather than the A-3 of the Flying Training Command.) Plans called for sending a minimum of 35,000 students to colleges not later than March 1, 1943, and an additional 35,000 were to be under instruction within the following month. The Flying Training Command had little more than a month to push through an involved and untried program. Careful planning of all phases was impossible, and the rush with which the project was launched was reflected throughout its existence.

By the middle of February the schools which were to receive the March allotment had been selected, and shortly thereafter decisions were made on the remainder.

At least the schedule was met, and by March 1 students were under instruction. The total number of students at one time, however, never reached the maximum proposed figure of 70,000. The highest number recorded was about 66,000 on May 1, 1943. The total number of colleges involved was 153.

Academic Instruction. . . . The first specified aim of the course, as outlined in the tentative program of January 23, 1943, was the "Preparation of Air-Crew students, both mentally and physically, for intensive ground training in the Preflight Schools." The prescribed courses, however, did not seem designed to accomplish that end, and the program finally adopted on February 24 stated that its objective was "to diminish the individual differences in educational background for subsequent air crew training."

The program divided the five-month training period into 21 instructional weeks with the academic courses scheduled as follows:

Courses	Hours	
MATHEMATICS		80
Arithmetic	14	
Algebra	20	
Plane and Solid Geometry	18	
Trigonometry and Logarithms	28	

Courses	Hours
PHYSICS	180
Mechanics	24
Heat	10
Electricity and Magnetism	18
Light	8
Laboratory	120
HISTORY	60
Emergence of the National State	9
Industrial Revolution and Rise of the Middle Class	6
Struggle for Democracy	15
Threat to Democracy	21
Issue of World War II	6
Programs of International Reconstruction	3
GEOGRAPHY	60
Earth and Maps	..
Climate and Weather	..
Physiography	..
Industries and Transportation	..
ENGLISH	60
Theme Writing	..
Public Speaking	..
Literature	..
CIVIL AIR REGULATIONS	24
MEDICAL AID	20

In order to fulfill the objective of the program, a system of electives was established. Any student whom the educational examination indicated as proficient in one of the prescribed courses was excused from it, although apparently instruction in three of the basic subjects was required for every trainee.

. . . On November 25, 1943, with the adoption of a new program of instruction, the elective system was abandoned. Each student was required to take all academic courses as follows:

Subject	Hours
Mathematics	80
Physics	120
History and Americanism	60
Geography	60
English	60
Civil Air Regulations	15
Remedial Instruction	80

Furthermore, specific directions were given for carrying out supervised study, a requirement vaguely indicated under the previous program. In each subject, five periods a week were scheduled for supervised remedial instruction.

Most colleges initially used the traditional college teaching methods of lecture, notebook, and examination. It soon became obvious, however, that this system not only was badly geared to the intensive learning pace required, but also left in doubt the extent of comprehension achieved by the student. It was likewise necessary to shift from the college to the high school level of instruction to adapt the teaching to the constantly declining caliber of the students. In the Western Flying Training Command, supervisors urged the faculties to emphasize a mastery of fundamentals. Techniques which had proved successful in preflight school were recommended. Each lesson was divided into teaching units of not more than 15 minutes, each unit being clearly understood by the students before the teacher proceeded to the next. This method required frequent participation by the student. Frequent questioning, repetition and drill, and summaries of the lesson were characteristic of the system. In other words, development of the student's skill and mastery of the material rather than mere exposition of the subject matter was established as the desired objective of the instruction. . . .

To assist in the grasping of the fundamentals, division of students into sections was suggested, and colleges were encouraged to use their own tests for the purpose. At Washington State College, three general curricula in mathematics were set up for each class, one for slow sections, one for average, and one for advanced. Students were informed that their experience and academic background were the basis for division, not differences in intelligence. Officials in the program at this college felt that such a grouping was of great value.

Efforts were made to keep the content of the courses as practical as possible. In furtherance of this goal, instructors in colleges in the Western Flying Training Command were furnished with a brief list of the ground school courses given in preflight and flight schools as an indication of the severely functional and technical type of work for which pre-preflight was to prepare. Individual efforts along this line were made by the instructors. One professor at the University of Washington reported that the material in the physics course was selected on the basis of its pertinence to the ultimate performance of a specialized task. Such a practice did not exclude a certain amount of fairly basic scientific knowledge, but even this, at times, was oriented toward the technological aspects. This utilitarian approach helped to maintain a high morale and to steep the student in the fundamental principles of the equipment which he was to use. The relation of science and mathematics to aviation problems was not too difficult for the trainees to grasp, but other courses presented greater problems.

Generally, colleges were left quite free to manage their own instructional problems. Standardization of instruction on any large scale was impossible, although in conformity with the trend in all air-crew training programs, some degree of standardization was attempted in the spring of 1944. At that time the Flying Training Command issued a set of instructions designed to limit the type of textbooks used and to bring them in line with requirements of the November, 1943, course of instruction. Desirable basic and supplemental texts were listed and institutions were directed that all changes in textbooks must be cleared through the appropriate command. At the same time standarized examinations in the five chief academic subjects were prepared at Headquarters, Flying Training Command and transmitted to the college training detachments with instructions for administering and covering their use and reporting results. The entire program was abandoned before the effects of this trend became evident. Within particular regions, however, a certain degree of uniformity was achieved through voluntary conferences of college presidents and university officials who met to talk over their success and failures in teaching methods and to pool their experiences.

One other policy that had some effect on instruction was that concerning eliminations. When the program began, eliminations from college training were permitted only for physical deficiencies, disciplinary reasons, or on request of the student. Eliminations for flying or academic deficiencies were not allowed. This restriction was a weakness, particularly in the academic program. In June, 1943, procedures were amended to provide for the elimination of students who demonstrated chronic airsickness or fear of flying. Finally in November it was provided that trainees who could not complete the course of academic training would be eliminated.

Of over 150,000 men who entered college between April 1 and September, 1943, approximately 1,250 students, less than 1 per cent, were eliminated. Elimination rates rose somewhat after the November directive but remained at a relatively low level during the remainder of the program.

CADET METEOROLOGY PROGRAM [2]

Training During the "Defense" Period 1940 and 1941. In 1940, when the German army was overrunning western Europe, the air arm of the American Army had fewer than 30 officers who had received advanced training in meteorology. As of July 8, 1940, General Headquarters, Air Force, the Army's air operational organization, had only one officer assigned to weather duty.

To ameliorate the situation, the Weather Section of Training and Operations proposed that 40 recent college graduates with majors in mathematics and physics be enlisted as non-flying "flying cadets" and assigned

[2] Excerpted by permission from "AAF Weather Training" (MS on file in Historical Division, War Department Special Staff), pp. 27–48.

to the regular nine-month graduate course in meteorology at several universities. Upon completion of this course these men would be commissioned second lieutenants in the Air Corps Reserve and "ordered to extended active duty with technical organizations."

While awaiting a decision from the Adjutant General, Training and Operations conducted a survey which revealed the fact that in all the United States there were only 377 qualified forecasters, of whom the Army had 62. There was need in the Army for about 285 more forecasters, it was believed. "If we have need for more than we are training," General Arnold, Chief of the Air Corps, demanded on reading the study, "why not make plans to cover the discrepancies?"

With its hand thus strengthened, Training and Operations launched a far more ambitious program—the training of 150 cadet meteorologists during the next academic year at the five universities in the United States then giving such training: Massachusetts Institute of Technology, New York University, California Institute of Technology, University of Chicago, and University of California at Los Angeles. . . .

Thanks to the combined efforts of the Air Corps and university officials, 116 cadets were studying at the five universities by early October, 1940. The courses they took were under the direction of some of the most distinguished meteorologists. At the start, the course of instruction differed in detail from one university to another. There was, however, a basic similarity inasmuch as all were modifications of the pioneer course given at Massachusetts Institute of Technology. The curriculum in effect at the University of Chicago during 1940–1941 may be considered representative.

Synoptic Meteorology, 4 hours a week, 1st and 2nd terms
Meteorological Laboratory, 16 hours a week, all 3 terms
Descriptive Meteorology, 4 hours a week, 1st term
Dynamic Meteorology, 4 hours a week, all 3 terms
Physics of the High Atmosphere, 4 hours a week, 3rd term
Laboratory in Upper-Air Observations, 4 hours a week, 3rd term

A second class, composed of 182 men, was started at the same universities on July 1, 1941. The entry of the United States into World War II the following December created such an acute and immediate need for additional weather officers that the class was graduated and commissioned on February 15, 1942, a month and a half ahead of schedule.

Training During the War. Pearl Harbor did not cause AAF officials immediately to attempt an estimate of how many weather officials would be needed for the prosecution of the war. But they did make plans for training on a vastly greater scale: 450 men in the third class starting on March 1, 1942, a fourth group of 1,000 men, and additional large classes starting every three months thereafter.

However, before these plans were completed, in the autumn of 1942, Brigadier General H. M. McClelland, Director of Technical Services of the AAF, returned from Great Britain convinced that the number of weather officers must be greatly increased to approximately 1,350 by June, 1943, 3,500 by September, 1943, 5,000 by January, 1944, and 10,000 by early 1945. Arrangements were made with the universities greatly to increase their facilities, and plans were drawn up to train cadets at the newly established Weather Training Center at Grand Rapids. Five hundred cadets entered Grand Rapids on January 4, 1943, and a second class of 887 on March 29. With the move of the center's facilities to Chanute, Illinois, later in the war, a third AAF class, numbering 467 cadets, entered on October 4.

Meanwhile, throughout the year 1943, at least one of the universities entered a new class every 12 weeks or more frequently. A class of approximately 1,750 cadets entered the five universities on January 4, another class began at three universities on June 21, and a third class of about 1,400 at all five universities on October 4.

Length and Content of the Course. During the autumn of 1942, when the need for additional weather officers was unusually great, the Directorate of Weather concluded that the length of the cadet course ought to be reduced from nine months to seven. The University Meteorology Committee (UMC), in the person of Dr. C. G. Rossby of the University of Chicago, resisted "rather strongly." Rossby urged adoption of a course 33 weeks in length, divided into three terms of 11 weeks each, with a week's recess between each term.

This latter plan was the one ultimately put into practice. The routine followed at the University of Chicago may be taken as representative. Cadets spent an average of six hours a day attending classes and four in supervised study hall throughout a six-day week. About two hours were spent in laboratory and field work for each hour of lectures. An examination covering all subjects was given weekly, and final examinations were given in each course. Physical and military training took place after class hours. The main features of the curriculum were as follows:

Descriptive Meteorology, 3 hours a week, 1st and 2nd terms
Synoptic Meteorology, 3 hours a week, all 3 terms
Meteorology Laboratory, 20 hours a week, all 3 terms
Thermodynamics of the Atmosphere, 3 hours a week, 1st term
Dynamic Meteorology, 2 hours a week, 2nd term; 3 hours a week, 3rd term
Oceanography, 2 hours a week, 3rd term
Elementary Physics of the Atmosphere, 2 hours a week, 1st or 2nd term
Climatology, 3 hours a week, 2nd or 3rd term
Meteorological Instruments, 6 hours a week, 1st or 2nd or 3rd term

Elements of Long-Range Forecasting, 4 hours a week, 3rd term, (for a certain percentage of top men in the class only)

Model Weather Stations and "Practical" Training. Early in 1943, at the time the UMC was making an attempt to standardize the curriculum, the Acting Director of Weather gathered a number of criticisms of university-trained weather officers which had been made in inspection and field reports. Too many officers, he found, knew little about the administrative duties of a weather officer, especially the proper way to fill out weather forms and records and aircraft clearance forms.

To help correct this situation, Assistant Chief Air Staff, Training, recommended that the universities and the AAF technical school incorporate in their curriculum a course at least 30 hours in length and known as Weather Station Operation and Administration. The university officials, however, demurred on the grounds that they did not have the necessary instruments and their instructors lacked adequate weather station experience to give such a course properly. . . .

As a result of the efforts of several agencies in Headquarters, AAF, model stations were installed at the universities and the AAF technical school during the summer and autumn of 1943. The universities found, however, that not enough time could be spared from a 33-week course to give a cadet adequate practical experience in the problems he would face in the field. The UMC appointed a committee to urge on Headquarters, AAF, the desirability of adding a fourth 11-week term to the course, to be devoted to practical application of the theoretical aspects of meteorology. Presumably most of this training would be accomplished in model stations. The plea was joined in by the Weather Wing and the Training Command. By this time, however, Assistant Chief Air Staff, Training, had adopted the general policy that the length of no AAF technical course was to be extended, and refused to make an exception in this instance.

THE PREMETEOROLOGY PROGRAMS

When General McClelland in 1942 stated that by early 1945 the AAF would need 10,000 weather officers, there were not enough young men in the United States with the educational qualifications necessary for the cadet course to meet this quota. He reasoned, therefore, that it would be necessary to lower the educational prerequisites for weather officer training and lengthen the course. Inasmuch as the five universities already had their hands full teaching the cadet program, it appeared necessary to engage the facilities of other colleges and universities to prepare promising men for the regular cadet course. Those who already had one year of college work might be prepared, it seemed, through six months of intensive training. . . .

Thereupon steps were taken to set up two pre-meteorology programs, both of them leading directly to the cadet course. To avoid confusion, the

cadet meteorology course was to be called the "A" course, the six-month pre-meteorology course, the "B" course, and the 12-month pre-meteorology course, the "C" course. For admission to the "B" course, a man had to be between the ages of 18 and 30 inclusive, meet the same physical requirements as a Reserve Army officer, have satisfactorily completed "in an accredited college or university . . . . mathematics through college algebra, trigonometry and elementary analytical geometry, and physics through a one year course." A student's status was that of a private until his admission to the "A" course, when he became an aviation cadet. To be eligible for the "C" course, a man had to be within the age limits of 18 to 21 inclusive, and have passed the reserve officer physical examination. He had to be a high school graduate who had satisfactorily completed two years of high school mathematics (including algebra and plane geometry) and one year of high school science. While taking the course he was to have the rank of private.

Curricula. More standardized curricula were used for the pre-meteorology courses than for the cadet course. The responsibility of drawing them up was assigned to the University Meteorology Committee, with supervision exercised by the Directorate of Weather. The largest share of the responsibility was placed in the hands of a permanent subcommittee of seven college professors. Besides drawing up the final curricula, this committee was to perform three functions: (1) make any changes in the course of study which became necessary after the program got into operation; (2) prepare uniform quizzes and examinations to be given in all the colleges; and (3) determine broad policies as to which students should be dropped from the course.

The training period of the "B" course was 26 weeks, although only 22 weeks were actually spent in class work. During their 6-day week an average of 8⅙ hours a day was devoted to academic work, and approximately 1½ hours a day to military drill and physical training. Of the 49 hours weekly given to academic work, approximately 25% was spent on lectures, 25% on recitations and quizzes, 5% on laboratory work, 35% on supervised study, and 10% on "free study." Briefly, the subjects covered in the "B" course were as follows:

Mathematics, 3 hours of lecture, 4 hours of recitation or quiz weekly
Mechanics and Vector Analysis, 3 hours of lecture, 4 hours of recitation weekly
Physics, 3 hours of lecture, 3 hours of recitation, 2 hours of laboratory weekly
Geography, 3 hours of lecture weekly
English, 3 hours of recitation weekly

In general, the pattern of the "C" course resembled that of the "B" course. Because it was intended for high school graduates, however, it ran

twice as long; the first half of the course was pitched on a more elementary level, while the second half was on the same level as the "B" course. The "C" course ran 48 weeks, divided into four terms, each 12 weeks in length. The subjects covered in the "C" course were as follows:

Mathematics, 3 hours of lecture, 3 hours of recitation weekly
Vector Analysis and Mechanics, 3 hours of lecture, 2 hours of recitation weekly
Physics, 2 hours of lecture, 2 hours of quizzes and discussion, 2 hours laboratory weekly
Geography, 2 hours of lecture, 1 hour of recitation weekly
English and History, 7 hours weekly, divided between composition and theme writing, and history lectures, discussion, and study

The premeteorology programs and the aircrew college training program were both discontinued in the spring of 1944, in accord with high-level policies of the War Department as developed abreast of the actual exigencies of the conflict. Particularly in the case of the premeteorology trainees, the sudden termination of the program brought some individual disappointments and depressing of morale; and the short period during which the aircrew and premeteorology programs were in operation necessarily limited the scope of the experience from which educational implications for the future might be drawn. Nevertheless, the presence, even for short periods, of Army Air Forces training programs in nearly 200 colleges and universities during the war was not without mutual values to the government and to the institutions, as well as to the individual trainees.

V. THE NAVY COLLEGE TRAINING PROGRAMS

ALTHOUGH over-all plans were publicly released in December 1942, it was not until May 19, 1943, that the Navy Department announced that nearly 80,000 young men would be called to active duty and assigned to study under the new college program on July 1, 1943. This release stated that of the 80,000 total about 15 percent were to be officer candidates for the Marine Corps, a few hundred were to be assigned to service with the Coast Guard, and the remainder were to be future naval officers.

In an address before the future V-12 administration officers (military and civilian) on May 14, 1943, Rear Admiral Randall Jacobs, chief of the Bureau of Naval Personnel, described the basic philosophy of the Navy program as follows:

> It is highly important, both to the colleges and to the Navy, that this program shall run smoothly from the beginning. . . . It would have been possible to begin our V-12 program earlier than July 1 of this year. But we decided that a plan of such magnitude, affecting the academic work of some 150 colleges and universities and the education of many thousands of students, should start only after the most thoughtful consideration both by the Navy and by leading educators of the country.[1]

Before the inception of the V-12 program, the Bureau of Naval Personnel, which by law is charged with responsibility for training officer and enlisted personnel, was beginning to feel the burden of its centralization of responsibility. Literally hundreds of thousands of officers and men were being indoctrinated or were receiving basic training at naval training schools and contract units throughout the country. The need for decentralization was apparent, as the following indicates:

> Accordingly, a Director of Training was appointed in each of the Naval Districts as a member of the Commandant's staff. These Directors of Training carried no authority of their own, but served a very useful purpose as service agents of the Bureau, interpreting Bureau directives and regulations to the various schools in the district, giving advice concerning

[1] Navy Department, Bureau of Naval Personnel, *Conference on the Navy V-12 Program at Columbia University, May 14–16,* NavPers 15012 (1943), p. 3.

local problems, making periodic inspections, serving as a clearing house for all district training activities, and thereby saving the Bureau much time.

When the V-12 program was established, the District Directors were given the general supervision of the units within their respective districts, and were ordered to make an inspection of every contract school at least once each term (four months). The visits were not solely for the purpose of inspection, but also to discover local procedures that were singularly effective in the administration of the program. These were to be reported to the Bureau, and passed along to other commanding officers for their adoption.[2]

On July 1, 1943, the V-12 program was launched at 131 colleges and universities, exclusive of medical, dental, and theological schools. The program proved its flexibility:

> Great difficulties had to be overcome in the early stages of quota planning, but the comprehensiveness and flexibility of the V-12 Program made possible numerous adjustments necessary where projected plans were not in line with current needs. So comprehensive was the program that men formerly classified V-1 and V-7 no matter what their majors—pre-medical and pre-dental students, students preparing for commissions as supply, deck, or engineering officers, Marine Corps Officer candidates, and a few from the Coast Guard—all were included in the same program. . . . The fact that there was a common core of training, which even the pre-medical and pre-dental students received in slightly different sequence, made possible the transfer of men from one curriculum to another whenever it was necessary.[3]

TRANSITIONAL PROGRAMS

When the official announcement of the Secretaries of War and Navy on the armed services' plans for the use of college facilities was released on December 12, 1942, several Navy training programs were already in operation at colleges and universities. The story of their mission, scope, successes and shortcomings, and final absorption by the V-12 program is best described in the Navy training history,[4] from which the following sections are adapted by permission:

> In the 1920's and '30's the Naval Academy and Naval Reserve Officer Training Corps furnished the Navy with the young officers needed to fill its

[2] Navy Department, "United States Naval Administration in World War II: The College Training Program," Vol. IV (MS on file in Office of Naval History, U. S. Navy Department), p. 118.
[3] *Ibid.*, pp. 68–69.
[4] *Ibid.*, pp. 5–12.

ranks. NROTC units had been established in 27 colleges or universities by 1940, and in 1940–41 had a total enrollment of 3,096 students who took courses in Naval Science and Tactics taught by naval officers along with their other college work. As the numbers involved were small compared to the demands of war and only a few colleges had units, comparatively little administrative experience was gained that was applicable to the establishment of a college program vastly expanded under the urgency of war.

At the outbreak of the second World War, the Bureau of Naval Personnel continued to approach the twin problems of procurement and training in terms of World War I. No plans were drawn for training personnel in anything like the numbers that were soon to be needed. . . . Yet by the end of that year the number of officer candidates alone equalled the total officer and enlisted strength of the Navy in the summer of 1939. . . .

The need for midshipmen's schools to train young Reserve officers for the fleet was recognized in the spring of 1940, and during that year Reserve Midshipmen's Schools were commissioned on the *Prairie State,* the old USS *Illinois,* which had been tied up in the Hudson River and converted into a training ship; at the Naval Academy; and on the Chicago campus of Northwestern University. A Supply Corps School was established the next year at the Harvard Business School, and at several other universities schools for training Diesel officers had been placed under contract. Thus, prior to Pearl Harbor, the Navy had made some use of the physical equipment and plants available on the campuses of the country, and in a few instances the skills of the faculty as instructors had also been employed.

The great development in the use of colleges and universities for training purposes, however, came after December 7, 1941. Numerous training activities, for both officer and enlisted personnel, were established on campuses in 1942 to provide a wide variety of specialized training. Enlisted men were trained as radiomen, electrician's mates, signalmen, storekeepers, and operators of Diesel engines. Officers were trained in meteorology, radar, military government, foreign languages, and bomb disposal, and attended "indoctrination" schools to the chagrin of those faculty members who had long looked upon "indoctrination" as the very antithesis of "education". . . . None of this training involved general education, and in a large proportion of the classes the instruction was by Naval personnel. College facilities were being used, but not, except to a very small extent, college faculties.

THE NAVY V-7 PROGRAM

Meanwhile in June, 1940, three days after the Franco-German Armistice had been signed, the V-7 program was announced to further the flow of college men into the Reserve Midshipmen's Schools that were being planned. The original announcement called for the enlistment of 5,000

men as apprentice seamen, V-7, for one month's training afloat. At the completion of the cruise the successful candidates were to be appointed Reserve Midshipmen and given a ninety-day course of instruction leading to a commission as ensign, USNR. Candidates were to have completed a minimum of two years of college, and were limited to the ages of 19 to 26. During the following year, 7,200 enlisted, but only 4,600 succeeded in earning commissions.

Because of the large number of failures among the candidates of the first year the educational requirements were raised to four years of college, including two semesters of mathematics. These higher requirements appear to have been justified as there was a 50 per cent reduction in the rate of failure, but the reduction may also have reflected the greater incentive to win a commission that arose from the increasing probability that the United States would soon be at war. By November 1941, all quota restrictions on the enlistment of engineering students in the V-7 classification had been lifted as the rapidly expanding fleet called for an ever greater number of officers. . . .

THE NAVY V-1 PROGRAM

Within a month of the announcement of the revised V-7 program, the Navy created still another class of enlisted men who were to remain in an inactive status while undergoing college training. This new V-1 program was open to men 17 and 19 years of age willing to attend college at their own expense until the completion of the equivalent of two academic years. Men in V-1 were to study a curriculum prepared by the faculty of whatever accredited college or university the individual chose to attend. The only limitation on the curriculum was that it must be acceptable to the Navy and must stress physical training, mathematics, and the physical sciences.

The Navy had hoped to procure "not more than" 80,000 men in V-1. Near the end of the third semester an examination was to be given on the basis of which approximately 20,000 were to be selected annually for transfer at the end of their fourth semester to V-5 and flight training. Another 15,000 were to be transferred to V-7 and continued in college at their own expense until a degree was received. Five thousand of these were to be engineering students. Those not selected for either V-5 or V-7 were to be called to active duty as apprentice seamen at the end of their fourth semester. . . .

The only curricular requirement of the original V-1 plan was that the student follow a course of study drawn up by the faculty and approved by the Navy which would emphasize physical science, mathematics, and physical training. . . . The Department, in view of the fact that enlistments in V-1 were not what had been hoped, became alarmed that such curricula would defeat the purpose of the entire program by discouraging all but a small number of the potential enrollees. . . .

The V-1 program was not a procurement success from the numbers point of view, but those college men who did enlist in it got more than an even break. Instead of getting something less than a fifty-fifty chance of entering an officer-candidate class, all V-1 students who maintained themselves in good standing in a college or university through the academic year 1942–43 were transferred to the V-12 program which offered them more opportunities to gain a commission than had ever been promised. Throughout the entire transition to the V-12 program the Bureau was careful to see that every promise made to students in either of the two earlier programs was scrupulously met.

THE NAVY V-5 PROGRAM

The Naval Aviation Cadets (V-5)[5] were men who had been procured by the Naval Aviation Cadet Selection Boards (NACSB) by a different procedure from that used subsequently in the selection of other V-12 students, and who were later transferred from V-5 to V-12 with the special designator "(a)." In their selection different standards were applied. Motivation (a strong and persistent desire to fly, the construction of model planes, and other evidences of an interest in aviation) was given much emphasis. Physical standards were also high, but if a boy was strongly motivated and passed his physical examination, the intellectual requirements were less rigid than those required of V-12 applicants. . . . After the inception of the V-12 program, instances were not uncommon where boys who were turned down for V-12 went across the street to the NACSB office and were enlisted in V-5, to be transferred into the V-12 program at a later date as a V-12(a). . . .

When the V-5's were transferred to the classification V-12(a), it was agreed by both DCNO (Air) and the Bureau of Naval Personnel that they should receive two terms of college training before assignment as Aviation Cadets. Apparently there was concern from the first that some of the V-5's lacked a suitable mathematical background to do college work, because an understanding was reached in a meeting of the Joint Procurement-Training Committee that the V-12(a)'s were to be subject to the same academic standards as the V-12's and also subject to the same separation procedures. Several meetings of the committee discussed the academic difficulties of the V-12(a)'s and there was good reason to do so as rumblings of discontent were being reported from several schools where they had been assigned. . . . Some V-12(a)'s, whether interested or not, were not academically or intelligently prepared to do the work in the V-12 curriculum. In such cases the maintenance of morale became a real problem. . . . At the end of the first term it was found that the academic attrition rate for those in V-12 was 5.86% and for those in V-12(a) 9.62%.

In time the V-12(a)'s adjusted themselves to the idea of eight months

[5] *Ibid.*, pp. 70–76.

of college. Meanwhile DCNO (Air) was beginning to discover that it had set its sights too high, and that the aviation program would have to be trimmed down. One way to accomplish that and at the same time raise the educational qualifications of the men was to keep the V-12(a)'s in college for a third term. . . .

The question of the third-term basic curriculum was finally settled in a meeting of the Joint Procurement-Training Committee. One of the representatives of training outlined objectives that were apparently acceptable to all: (*a*) give the aviation candidates such academic work as would help them become better Naval officers, and not just better pilots, and (*b*) furnish training that would permit them, if it were ever desirable, to transfer to other curricula. In line with these objectives the committee decided that all the V-12(a)'s should take the third-term basic curriculum, and that no distinction should be drawn between V-12 and V-12(a) programs.

NAVAL RESERVE OFFICERS' TRAINING CORPS (NROTC) [6]

The establishment of a NROTC in American colleges and universities was authorized in 1925. The original six institutions where the course was put into effect in 1926 had increased to 27 prior to the outbreak of World War II. Down to July 1, 1943, a basic course covering the first two years, and an advanced course extending through the junior and senior years were offered. The curriculum, so far as the choice of subjects went, was based on the curriculum at the Naval Academy; but the actual scheduling of the courses was the individual concern of each professor of Naval Science and Tactics.

With little or no centralized control, the curricula at the various institutions authorized to conduct NROTC training grew up in virtual independence of each other. In a letter of September 4, 1941, the Bureau of Naval Personnel expressed its desire to standardize training to the point where all units would teach the same subjects in each of the four years allowed for the course, thereby bringing candidates to the same relative stage of training prior to graduation. Alternate type schedules were offered for comment; but no effort was made to prescribe how much time should be allocated to each subject, beyond a recommendation that the general outline of instruction at the Naval Academy should be taken as a model. . . .

On July 1, 1943, the Navy V-12 program went into operation under wartime emergency legislation. The NROTC program thereupon became amalgamated with it, but was allowed to retain its own identity, since it was a continuing program established by Congressional action and since

[6] Excerpted from Navy Department, Bureau of Naval Personnel, Training Activity, "U. S. Naval Administration in World War II: History of Line Officer Training," Vol. VI (MS on file in Office of Naval History, U. S. Navy Department), pp. 1–3.

it was always intended that with the return of peace the training of Naval Reserve officers should be put back on the pre-war basis. . . . Since the first two terms of V-12 included no Naval indoctrination other than a basic course in Naval Administration, NROTC students were required to complete in an accelerated course of five semesters the work which had hitherto been scheduled for eight semesters. The previous division of the course between basic and advanced levels was discontinued, and candidates instead indicated their preferences for majors in General Line, Business Administration, or Engineering within the Naval curriculum.

THE V-12 PROGRAM [7]

The V-12 program was distinctly a college program designed to give officer candidates the requisite and minimum education necessary to more specialized training as officers, and to give it on an accelerated schedule. . . . Aside from the pre-medical and pre-dental students, there were three groups that had to be kept in mind in the preparation of curricula. The *first* included students who had been transferred from V-1 and V-7 with some college work already completed. Because of the promises that had been made at the time of their enlistment, they were permitted to continue the curricula they had been pursuing before their transfer to V-12 so long as they met certain minimal requirements and care was taken to send them to schools offering competent instruction in the field of their respective majors. Bona fide engineering students were permitted a total of eight terms of college work from their matriculation. Pre-medical, pre-dental, and pre-chaplain students were to be given the minimum time necessary to complete the requirements for admission to their professional training. . . .

The *second* group of students included those who had never been enlisted in any of the earlier programs, but who also had advanced standing. . . . They were allowed much freedom, but were urged to include as much of the fully prescribed curricula as the number of terms allowed, and had to satisfy at least the minimum requirements established for the V-1's and V-7's. The trainees in neither of these first two groups were classified according to the type of commission they would receive or the duty they would perform after commissioning until they were ready for Midshipmen's Schools.

Both of these first two groups of trainees, all of whom were advanced students, were called "irregular," and during the early part of the program furnished the unit administrative officers and college deans much work in adapting their former programs to the requirements of the Navy and in determining the number of terms of college work that had been completed. . . . This use of time-spent-in-college rather than credits earned to fix the amount of time allowed was almost the only workable basis that could be used, however, where so very many institutions were involved.

[7] Navy Department, "The College Training Program," pp. 77–107.

At all times, the Navy took the position that it could not be concerned with the interminable question of college credits, and in view of the extreme skepticism with which institutions of higher learning look upon the credits of sister institutions the decision was sound.

The *third* group of students were those who entered the program as first term freshmen, and who were required to follow a fully prescribed curriculum.[8] . . .

All these "regular" V-12 trainees, with the exception of the pre-medical and pre-dental students, first took two terms of work that was identical for all types of officer candidates. During the second 16-week term the trainees were screened to one of nineteen upper-level curricula which were intended to prepare the trainee for the type of duty he would later be assigned. The advanced curricula varied in length from two terms for deck candidates to six terms for engineering and pre-theological students. . . .

THE V-12 CURRICULA

Naval Subjects: Indoctrination. Only two courses in Naval subjects were included in the V-12 curricula, excepting courses in the NROTC. A two-term course in Naval Organization, meeting one hour a week, was required of all regular students during their first two terms, and all except supply, pre-medical, pre-dental, and pre-chaplain students took a three-hour course in Naval History and Elementary Strategy with their more advanced courses. The course in Naval Organization was usually taught by one of the Naval officers attached to the unit and covered Navy Customs and Courtesy, Navy Law, Intelligence, Naval Communications, Naval Personnel, and Navy Organization ashore and afloat. The course served an important function in introducing trainees, particularly those without previous Naval experience, to certain basic knowledge essential to all officer candidates. The quality of the course varied even more widely than is commonly true of courses taught by different instructors, because most of the officers had had very little Navy experience and there was very little material at hand to help them in their initial efforts. . . . Anxious as most trainees were to learn more about the service of which they had become a part the trainees could have made very good use of an intelligently written book had it been available in sufficient numbers. . . .

The only other Naval subject taught in the V-12 program was the one on Naval History and Elementary Strategy, which presented no unusual problems except possibly for the civilian history instructor who suddenly found the course thrust upon him. Sound historical material in the form of specialized histories, biographies, and textbooks was available in quantities sufficient to meet most needs, and Brodie's *A Layman's Guide to Naval Strategy* proved to be a timely aid in teaching certain elementary and basic principles of that art. . . .

[8] See Navy V-12 Bulletin, No. 101, pp. 35–36.

PREPROFESSIONAL AND PROFESSIONAL CURRICULA (MEDICAL AND DENTAL)

Problems and Remedies. The medical, dental, and theological curricula gave rise to special administrative problems caused primarily by the fact that the training was professional in nature. . . .

By an agreement between the Surgeons General of the Army and Navy and the War Manpower Commission (WMC), the available space in the professional schools of the country was allocated as follows: the Army was to use 55% of the space in medical schools, the Navy 25%, and 20% was to be left for the use of civilian students; of the dental space 35% was assigned to the Army, 20% to the Navy, and 45% was left for civilian use. It was further agreed that if the entire space available to civilians was not used, the Navy would be entitled to one-third of whatever space was in excess, thus permitting a maximum total of 31⅓% of the medical space. To prevent undue expansion of the medical program, the Procurement-Training Committee ruled that if civilian students enlisted in the Navy, they and any Ensigns H-V(P) on inactive duty in the professional schools were to be included in the Navy quota which was never to exceed the 25% originally contracted for, plus a maximum of 6⅔% of any unused civilian quota.

Considerable pressure was exerted from time to time by the WMC to have the Navy train men for civilian uses. Each such effort was in vain as the Navy took the position that responsibility for meeting civilian needs, however justifiable, did not properly belong to the armed services. One of these efforts concerned the medical program. In April, 1944, the Army announced a reduction in its Specialized Training Program, which meant that 2,000 spaces would go unfilled in medical schools and 1,000 in dental. The Chairman of WMC was immediately concerned as the country faced a serious shortage of physicians that would be felt for years after the war if the flow of medical students was not continued. The situation was further aggravated by the decision of the Director of Selective Service, due to the great demand for physically qualified young men in the services, to do away with the deferment of pre-medical and pre-dental students unless they had matriculated in a professional school by July 1, 1944. A meeting of the Surgeons General of the Army, Navy, and Public Health Service was immediately held with representatives of WMC. It was their unanimous opinion that the position taken by Selective Service would "result in a situation which would be disadvantageous and even dangerous to the armed forces and the civilian population." It was agreed that the matter was of serious enough import to be taken to the President if necessary to obtain action. They underscored their feeling in the following words:

"We all wish to go on record to the effect that should later developments such as an epidemic of great magnitude, war casualties of un-

anticipated numbers or any other unexpected demand upon medical manpower [occur] . . . we not be in the position of not having done everything in our power to have prevented this medical manpower production interruption. . . . We don't believe that the places vacated in medical schools by the change in Army plans can be filled with women, 4F's, and men discharged from the armed forces. . . . We feel that this is perhaps the most serious problem on which we have had to take a position and for that reason we feel it our duty to take an unequivocal position. . . ."

Despite the force of this argument the Director of Selective Service refused to change his policy, with the result that hundreds of young men who were ready to enter medical schools in the fall of 1944 were drafted. In a vain attempt to forestall the section of Selective Service the Chairman of WMC therefore appealed to the War and Navy Departments to place sufficient pre-professional undergraduates in an inactive duty status to maintain the flow to medical schools. The numbers were to be kept as low as possible, and the machinery for allocating the students to the professional schools could be handled, he suggested, through the Procurement and Assignment Service which provided medical officers to the armed services. Not more than 4,000 pre-meds and 2,000 pre-dents, including men both under and over 18, would be involved. In keeping with its policy on similar occasions the Navy rejected the proposal on the ground it was not the Navy's mission to train doctors and dentists for the civil population. . . .

During the operation of the V-12 program approximately 4,600 medical and dental students completed their professional training in addition to another 5,000 medical and nearly 1,400 dental students who received a part of their professional education during that time. These figures do not include the thousands enrolled in the pre-professional curricula on the undergraduate level. At the end of the war a considerable proportion of the Navy's Medical and Dental Corps, approximately 23% of the medical officers and 20% of the dental, had completed their education in the V-12 program. Thus the program had accomplished much to overcome the serious shortage of officers in those fields, and in another year the proportions would have materially increased. . . .

THEOLOGICAL CURRICULUM

Pre-theological and theological students were included in the V-12 program on the basis of denominational quotas which were at no time very large, the total number being approximately 400. Pre-theological students were permitted eight terms of college work during which they carried some electives as well as the prescribed courses in the liberal arts, and on the professional level theological students received six terms of work. Early in their training students who wanted to become chaplains applied to the

Bureau of Naval Personnel for such permission. If their academic record and physical and officer-like qualities qualified them for consideration, the applications were then sent to the Chaplaincy Commissions of the various denominations participating in the program. The Chaplaincy Commission of the applicant's denomination had the responsibility of ascertaining from his synod, conference, presbytery, diocese, congregation, et cetera, whether or not he was a bona fide candidate for the ministry and of certifying the fact to the Navy. At any point in his training the candidate could be dropped from the program for any of the reasons applying to other officer candidates, and in addition he was subject to separation if his denomination withdrew its ecclesiastical endorsement. . . .

Only 29 former V-12 students went on active duty as Naval chaplains before the Japanese surrendered, but by the time the theological portion of the V-12 program closed in March, 1946, another 45 had been commissioned in the Chaplains' Corps. It is, therefore, evident that the Chaplains' Corps did not profit materially from the men trained in V-12; however, had the war lasted for another year, the number of chaplains furnished by the program would have been much larger and would have been an important source, inasmuch as the procurement of chaplains from civil life had nearly ceased. Furthermore, there is again evidence to indicate that the program had real value in developing good public relations with the various denominations by showing a concern on the part of the Navy for the spiritual welfare of its men. . . .

ADMINISTRATION OF ACADEMIC PROGRAM

No principle was more fundamental to the administration of the academic program than the assumption consistently followed that the Navy had hired all the competence, skill, experience, and wisdom of the institutions under contract. It was assumed that each institution was thoroughly competent to offer the required work, and therefore was free to expand and amplify the minimum outlines as its facilities and the time limits permitted. Freedom of action was also permitted in a number of other ways. Each school was free to determine whether or not it would grant college credit for the V-12 courses, to set its own examinations, to arrange class schedules in consultation with the local commanding officer, to arrange substitute courses for students who had completed courses of the prescribed curricula, and to select the textbooks that were used. . . .

The enforcement of academic standards was the joint responsibility of the college administration and faculty and the commanding officer of the local unit. The primary responsibility, however, rested upon the college, which was expected to maintain a high quality of work "in accordance with that previously required by the institution in its normal operation." . . . It adhered to that principle throughout the entire program with ex-

cellent results, for the colleges were generally spurred on to their best efforts by the liberality of the policy.

The commanding officer's enforcement of academic standards was additional to that exercised by the colleges, and in no way supplanted the proper function of the institution. Because the V-12 program was a military program and the trainees enjoyed unusual privileges, the same degree of latitude could not be permitted students who were doing unsatisfactory work as was too frequently typical of peacetime education. . . . One common technique was to restrict to the campus trainees who failed to maintain established standards of academic work. This was not infrequently done on the ground that the restriction would give the trainee more time in which to study, but undoubtedly the stimulus that arose from his desire to enjoy week-end liberty was equally effective. . . .

ATTRITION STATISTICS

Academic attrition produced no particular surprises; the over-all rate was 8%, approximating the normal rate in American colleges and universities. Careful studies were made of the rate of attrition in the various colleges and curricula in the program, with the result that after the first term the Training Division was able to estimate the total attrition for each term within one per cent of the actual figure. While no study of the causes of attrition can be accepted without major qualifications, inasmuch as the stated cause is dependent upon the judgment of the faculty member or naval officer who made the report, still a study of the causes of failure reported during the first term—July 1, 1943 to November 1, 1943—is of interest:

Causes	Number of Cases	Percentage
Inadequate preparation	508	13.82
Low mentality	1,558	42.40
Lack of application	1,202	32.73
Lack of officer-like qualifications	321	8.76
Emotional instability	24	0.66
Physical illness	60	1.63
Total	3,673	100.00

The same study showed that the subject-matter fields causing the highest attrition were the following: mathematics, 28.57%; physics, 24.89%; history, 10.14%; English, 9.31%; chemistry, 9.20%; and engineering drawing, 6.04%.

Despite the adjustments made toward the middle of the first term and continued in other terms, mathematics and physics consistently took the largest tolls as they were heavily emphasized in the program and would

normally have been avoided by many of those who had difficulty with them. Possibly more significant than this last study was one which showed that there was no correlation between the attrition rate at schools and the quality of the work performed as evidenced from the achievement tests which the trainees took when being screened to the upper-level curricula. . . .

AUXILIARY ENTERPRISES [9]

In addition to the main V-12 program there were four auxiliary programs, small in size, administered by the College Training Section in accordance with much the same policies that controlled the larger program. The V-5 and V-7 academic refresher programs were college programs designed to enable V-5 and V-7 candidates from the fleet who had already had some college education to enter Pre-Flight Schools and Reserve Midshipmen's Schools with a preparation more nearly equal to that of the men coming from the V-12 program. The other two programs, the Pre-Midshipmen's School and the Pre-V-12 School, were joint efforts to solve certain administrative problems which the V-12 program had itself engendered.

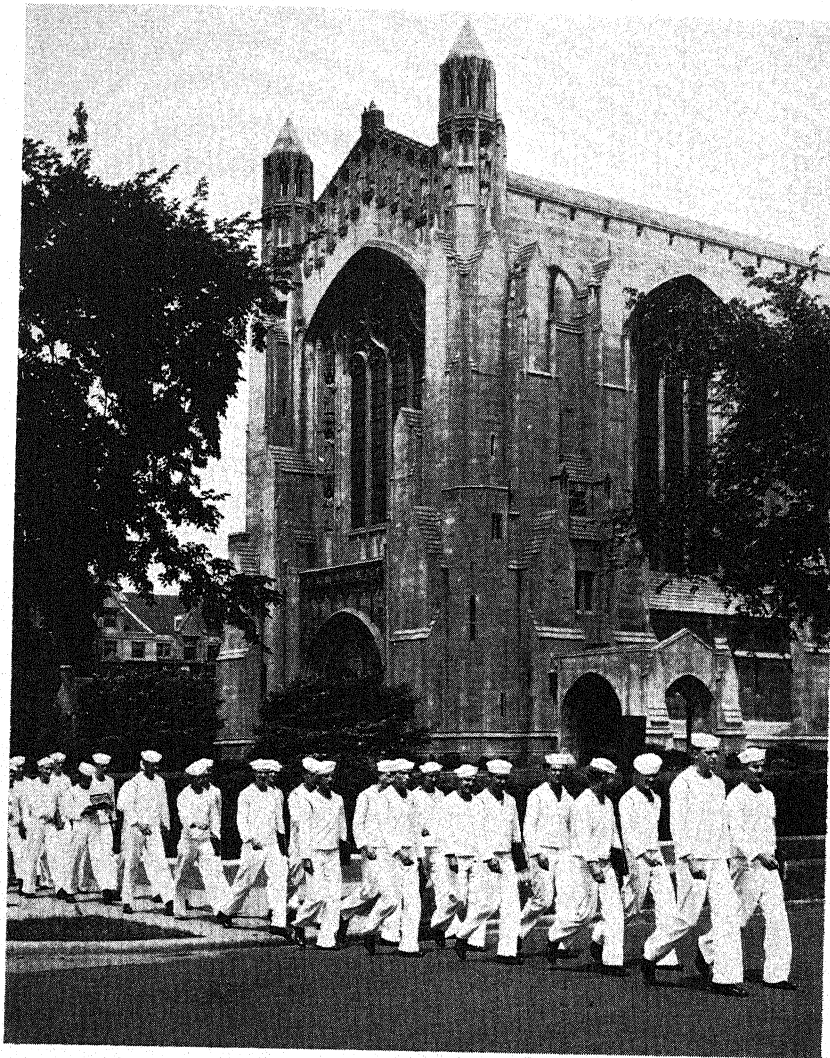
The Pre-Midshipmen's School came into being because of the impossibility of sending on to Midshipmen's Schools all the graduates of the V-12 program immediately after the completion of their undergraduate training. In order to make possible transfers from one V-12 unit to another, the Navy had required all participating institutions, with minor exception, to go on a three-term calendar. . . . The opening of classes in the Midshipmen's Schools did not wholly coincide, however, with the graduation dates in the V-12 program. Consequently, interim duty had to be provided thousands of V-12 trainees awaiting transfer to Midshipmen's Schools, and it was decided to establish a Pre-Midshipmen's School at Norfolk to serve that purpose. In reality the school was to be a receiving station or pool, and at first little thought was given to the question of training during a trainee's stay there. . . .

Because of the crowded conditions in the Norfolk area the Pre-Midshipmen's School was moved to Asbury Park, New Jersey, on March 1, 1944, and a year later to Princeton University. . . . While the program never proved wholly satisfactory, it served a very real need, and the only alternative to such a "pool" of trainees would have been to pull some trainees out of the middle of their last term of V-12 training so as to maintain an even flow to the Midshipmen's Schools—a policy to which all those sections in the Bureau responsible for the V-12 program were unalterably opposed.

Had the Pre-Midshipmen's School operated by itself it would have been extremely busy the first two months of each four-month term, and then have had practically no trainees on board the last two months. This might have necessitated disbanding all but a skeleton force of Ship's Company

[9] Navy Department, "The College Training Program," pp. 129–33.

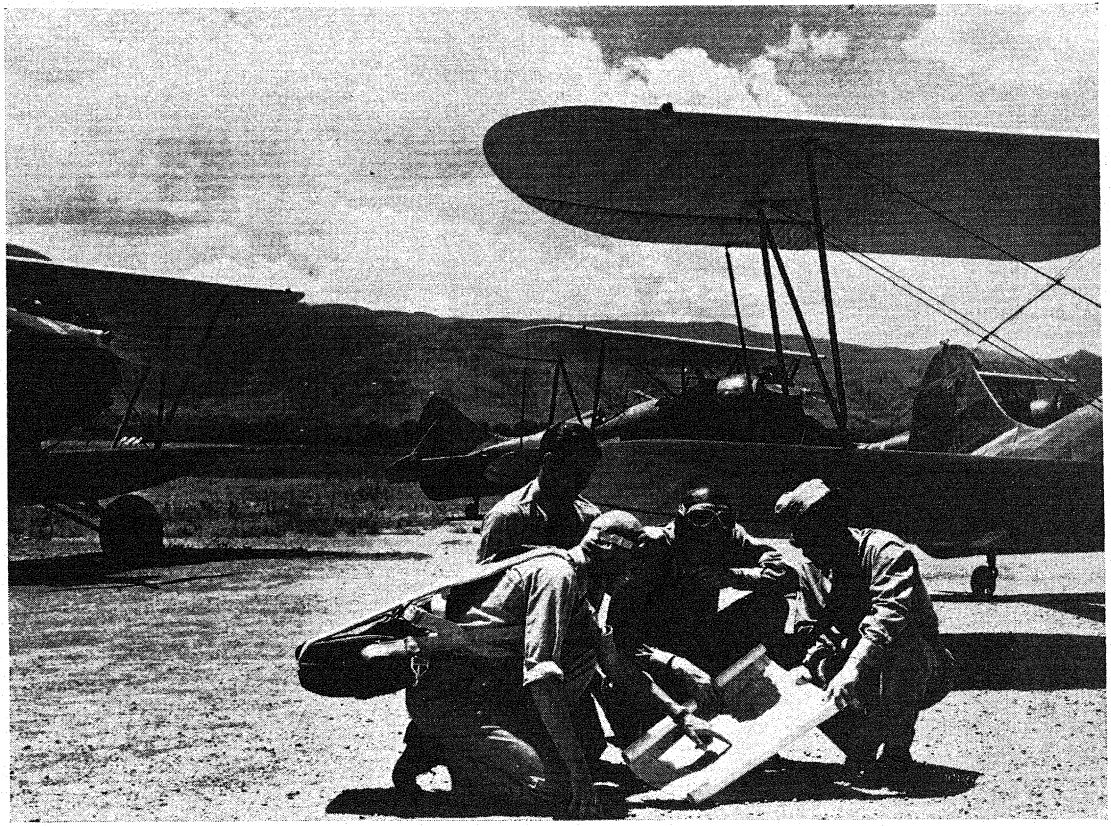
PLATE III



University of Chicago Photo

NAVY TRAINEES AT THE UNIVERSITY OF CHICAGO MARCH TO CLASS, PAST THE ROCKEFELLER MEMORIAL CHAPEL

PLATE IV



University of Colorado Photo

V-5 STUDENTS IN THE NAVAL TRAINING PROGRAM AT THE UNIVERSITY OF COLORADO

in the middle of each term and reassembling a new one at the beginning of the subsequent term. Fortunately the Pre-Midshipmen's School was coupled with the need for pre-V-12 training and made possible continuous operation of the school. During the first two months of a term it was a Pre-Midshipmen's School and during the last two months it became a pre-V-12 school.

Experience during the first term of the V-12 program with enlisted men drawn from the fleet and shore establishments indicated that a large proportion of them had difficulty in adjusting themselves immediately to the prescribed college work. Several factors were responsible: (1) Many of the men had been away from school for many months, with the result that they had forgotten much of the subject matter of the courses which they had passed in good standing; this was especially true in the fields of mathematics and physics; (2) difficulty in readjusting their habits to the routine of effective study plagued many trainees; (3) some men had been selected under misinformation as to the purpose of the program; and (4) some men were not adequately prepared to pursue the V-12 courses successfully. . . .

Consequently, it was decided to set up the pre-V-12 school in conjunction with the Pre-Midshipmen's School, and order in men from active duty so as to give them as much training as the time available, ordinarily approximately two months, allowed. Initially 110% of the quota to be put into the V-12 program from enlisted men were sent to the school, so that up to 10% could be screened out. The school proved to be a very satisfactory adjunct to the program by culling out unfit men who would otherwise have entered the program and by assisting the qualified trainees to make the transition back to academic life.

. . . With the scheduled output of V-12(a)'s in prospect it was decided that the Flight Preparatory Schools could be closed, but that refresher training for men coming from the fleet should be offered before they were sent on to Pre-Flight Schools. DCNO(Air) took up the problem with Training, and a plan was worked out that prevented any of the colleges losing Flight Preparatory units from suffering any hardships. As this was the first termination of a major college program, college officials kept an eye on the Navy to see how it handled the problem. The solution was worked out to the satisfaction of the colleges. Those colleges that had V-12 as well as aviation units had their V-12 quotas increased to compensate them for the loss of the aviation cadets. Eight of the other institutions were given V-5 academic refresher units, and the remaining three were awarded V-7 academic refresher units.

These academic refresher units were governed so far as possible by the same regulations and directives that were used in the V-12 program, and the same basic manual for the operation of the larger program was applied to the two smaller ones. The men were given an examination upon arrival

at their respective units, and each college determined whether the man needed 8, 16, or 24 weeks of refresher work, depending upon his preparation and the program in which he was enrolled. Thus the colleges were given programs that they could well handle and that used the facilities abandoned by the Flight Preparatory Schools, and training that the Navy needed was provided. . . .

PRODUCTION RESULTS FOR THE PROGRAMS

The statistics of student input, output, and attrition are recorded in Table 3.

TABLE 3

NAVAL COLLEGE TRAINING PROGRAM ENROLLMENT STATISTICS, JULY 1, 1943, THROUGH DECEMBER 31, 1945 *

Curriculum	Input	Output
Basic V–12	70,973	35,576
V–12 (a)	24,213	7,659
NAPP (V–5)	8,570	677
V–12 Engineering	27,333	9,634
Premedical and Predental	10,931	2,804
Pretheological	273	110
NROTC	9,200	7,415
Marine Corps	14,821	11,538
Theological	233	58
Dental	2,846	1,415
Medical	8,954	3,588
Total	178,347	80,474†

* Supplied by the Office of the Director of Training, Bureau of Naval Personnel.
† Aggregate losses by attrition during this period were 44,004.

VI. OUTCOMES AND IMPLICATIONS

THE PRIMARY lesson to be drawn from the war experience as a whole is that military victory can be traced in large part to the high level of intelligence and character of the personnel available for training and to the high level of education of the men recruited into the armed forces. Never before in the world's history has a manpower pool been so well educated.

This study indicates how the war brought challenges and opportunities of one sort or another to higher education. For those acquainted with the college training programs of the war, it may be recalled that classroom instructors and program coordinators met the manifold curriculum problems with patriotic fervor. The wartime experience demonstrated that civilian educational method can be modified so that subject specialties through proper emphasis and through collaboration on the part of instructors can contribute to a meaningful whole. If this be true in wartime, it ought also to be true in the postwar era when the educational pattern will need to be cut to fit the needs of a changing civilian society.

The conversion of our colleges from peace to war created some misunderstanding and misapprehension. As one program after another was launched between 1941 and 1945, the question arose in collegiate circles whether the military-sponsored college training programs would contribute to the decline of the liberal arts.

The military was firm in the assumption that the test of any training program was whether the product could perform well in the field of his specialization, not whether it prepared a man for intellectual freedom. The liberal arts proponents claimed that education, as distinct from training, is as essential in war as in peace. Education, they stated, involved the ability to meet the issues of life with imagination and resourcefulness, the ability to view the present in its relationship to the march of civilization, and the ability to think clearly when faced with complex issues, especially those involving widespread prejudices.

The nation-wide survey of college faculties conducted for this

study during 1946 revealed the widespread belief among those who had instructed in the programs that trainees were weak or generally deficient in mathematics, science, and language arts, and that the secondary schools of the country had done a poor job in teaching these subjects. Nevertheless, there were many who wanted to know: "Did the great bulk of men in the programs who were destined to become infantry, supply, and deck officers or NCO's need to develop advanced skills in mathematics and science?" For those trainees who were screened into advanced curricula, such as aerology, engineering, and medicine, there was agreement as to the importance of comprehending mathematical formulae and their functions in particular fields of specialization. It is evident that in peacetime there will continue to be a need for ability in technological fields.

ASSESSING THE EXPERIENCE

Considering everything, the war experience should not be looked upon as wasted years for higher education. It is true that certain educators harbor a sense of disillusionment and wish to forget the war period as quickly as possible; others view their experiences in a skeptical mood and are inclined to doubt the validity of purported gains to civilian education. These are natural reactions in view of the trials and tribulations encountered by individual faculty members and by the institutions themselves. One need but recall such matters as staff depletion, heavy teaching loads with little if any increase in compensation, accelerated course schedules, additional committee responsibilities, burdensome remedial study obligations, and military interference with instruction, to appreciate such disillusionment. One may add, however, that we are still too close to the experiment to prophesy with any degree of accuracy what may be the lasting and tangible gains for higher education.

It is impossible to think of higher education and the responsibilities which the atomic age have imposed upon it except in terms of adjustment and redirection. Since war accelerates social and educational change, in what ways may the war training programs, in the absence of little that is admittedly new, have contributed to the redirection of postwar education?

The war has made higher education increasingly aware of the need for continuing to integrate knowledge. Emerging social developments and the specific needs of the individual in a democratic society indicate that subject matter can no longer be presented in unrelated form and be of greatest value. Undoubtedly, the direction that postwar education will take will be influenced by the major attempts in the armed services college training programs to create a more closely integrated curriculum. The success of several courses—for example, the ASTP foreign language and area studies and the Navy course Foundations of National Power—may be largely attributed to the nation-wide efforts of college instructors, representatives of many disciplines and academic departments, who were able to break the shackles of traditional departmentalization.

The devices used to foster synchronization are by and large now applicable. Students, particularly veterans, are eager to have their studies so organized that the relationship between courses will be meaningful. To the degree that a student is able to comprehend the values inherent in different methods in education and at the same time to be conscious of his own subjective reactions, he acquires an appreciation of knowledge in general and of his own field of concentration in particular. Although it is seldom achieved, the ideal situation is to apply what is learned today in mathematics to the problem that will be studied tomorrow in physics, in order to comprehend facts and values in relation to the whole.

Many institutions of higher learning, encouraged by their war experience, are making constructive efforts to help the student form a logical pattern of what he learns. Such attempts are noteworthy and should be encouraged, for the liberally educated man is one who is able to comprehend the relationships between facts and values in the main areas of knowledge.

The intensive and accelerated nature of the college training programs created the major adjustment that had to be made during the war, and opened a vista for further practical experimentation in time-saving. It is as imperative now as it was during the war that variety and flexibility of programs be provided

for the heterogeneous student group now enrolled. During the war, acceleration was primarily an extension of the academic year. Because of this, the term "acceleration" has acquired an unfortunate connotation. As a matter of fact, time in relation to the learning process may be expedited in numerous ways:

1. For the mature student, credit by examination could conceivably become as accepted a method in higher education as credit by course taking.

2. Greater recognition could be given to the school's responsibility for off-campus experiences that provide continuous growth and sequence to learning.

3. Re-evaluation and reorganization of curriculum, course content, and methods of instruction could result in economy of students' time and contribute to the efficiency of instruction and learning.

4. Techniques could be devised to speed the progress of those students whose social or academic backgrounds do not fit conventional molds, but who are in intelligence and achievement superior to the average student.

5. The present all-time record in enrollment and the long-range trend of increased registration should implement a fuller utilization of the school plant by staggering attendance, by initiating off-campus opportunities, and by intensive special work covering the subject matter more rapidly than the usual class.

6. Carefully selected groups of superior and well-adjusted students could be permitted to proceed at a faster rate. There is less risk of social maladjustment in such groups than there would be for the individually accelerated student.

7. Because of the increase in student enrollment and in the number and variety of educational programs, the need for individual guidance at the college level has increased; facilities for this service can be expanded and refined.

Institutions of higher learning are faced with the postwar responsibility of establishing specific goals and desirable outcomes for their instructional programs and for instituting procedures that will assure the realization of those aims. In the

basic training courses for enlisted men and in the ROTC military science courses, wherein there was no fear of infringement upon academic freedom, both the Army and Navy worked consistently for the improvement of instruction. In brief, the strategy of teaching emphasized that:

1. Each curriculum should be designed to meet specific needs.
2. A clear identification of objectives for each course and each lesson is essential.
3. Adequate testing techniques should be utilized to test the effectiveness of the results of instruction.
4. The various techniques of curriculum building and revision should be studied and developed.
5. Cooperative effort in the production of lesson materials and teaching aids should prove beneficial.
6. No single method of classroom instruction will apply to all situations; a combination of several methods may be used to advantage in a single lesson.
7. There should be frequent application of the principles learned by actual performance whenever possible.
8. When germane and to the point, showmanship and humor should be used to enliven the instruction.

While colleges and universities in this country have for decades worked to improve instruction, the fact remains that some of the best and some of the poorest teaching is found in college classrooms. A careful review of course offerings and curriculum objectives is a never-ending process, which requires the whole-hearted support of every member of a faculty. Only under such a plan will extraneous subject matter be eliminated. Careful evaluation will result in defining more clearly than in the past what is to be accomplished, and in establishing an educational philosophy that is built upon purpose.

Procedures instituted in the ASTP for supervising instruction have opened the sacred precinct of the classroom. Many teachers, for the first time, have learned the value of such supervisory procedures as faculty auditing, students' evaluation of instruction, faculty conferences on syllabus construction and revision, joint efforts in test construction and grading,

and department checking of aims and objectives at periodic intervals.

Compensations for academic achievement need to be something more than good grades and paper honors. "Playing for keeps" was regarded by the civilian educators as the strongest factor which distinguished the military from civilian classes. Such incentives as an officer's commission, a raise in pay upon achieving a goal, and an elevation in social status were inner drives that motivated student proficiency. Conversely, the bugaboo that haunted every man was the fear of separation for any of the following reasons: lack of officer-like qualities, academic failure, illness or physical deficiency, and conduct unbecoming an officer candidate. The disgrace related to separation and the realization that he was thereafter deprived of the opportunity to become an officer were also drives that forced the trainee, particularly in the Navy V-12 program, to a high degree of application.

In the aviation programs and in a few of the technical and specialized fields, men assumed the attitude that each new concept was important in a war of attrition. Most men relished with pride the confidence placed in them by the selection board. Such urges made men conscious of the need for gaining proficiency in the subject matter and skills which were directly applicable to duty assignments that were only days removed from the classroom.

The armed forces college training programs have demonstrated the value of planning the instructional program at the level of the students' needs and objectives. The outcome of such a program is that it creates for students a sense of direction. It is difficult in civilian education to create incentives that are comparable to those possessed by the armed forces. Of course, there is no magic key, but higher education must make every effort to arrange the courses of instruction so that they will motivate students to attain their desired and foreseeable aims, cultural and vocational.

The armed services placed an emphasis upon the values of a cumulative record which accompanied each man from the

period of his induction throughout his entire tour of active duty. The challenge to higher education is to adopt similar techniques in order to promote student adjustment for a role in a free society and to foster the coordination of all personnel activities and agencies connected with education and placement. Since leadership and personality standards were not divorced from the academic, the rating of students on a cumulative basis in all of the positive characteristics was the joint responsibility of civilian and military staffs.

The cumulative records proved of inestimable value to each commanding officer when it came time to screen candidates into fields of higher specialization and to recommend to higher authority those students best equipped to perform creditably in advanced curricula.

Throughout the entire period of instruction, each trainee knew that since he was hand-picked he must be worthy of the trust. In anticipation of a trainee's assignment to a position of command, men were encouraged through rotation of military duties to gain experience and to evince aptitudes for leadership and devotion to duty. Self-discipline was also encouraged as was the sincere respect for the integrity of others. Repeated failure in this wide range of social relationships resulted in a trainee's separation from a program.

The war experience has demonstrated the importance of a cumulative record for each student and the effect of such a system upon his adjustment and development. When tied closely with guidance and counseling, the system became more than a dead file of ratings. The wise counselor was not concerned with a few unfavorable entries. He was interested in development and in the gradual disappearance of adverse or negative comments. The average trainee was interested in his shortcomings and made consistent effort to improve.

Many institutions have for years provided guidance programs whereby students have received personal counseling and guidance based upon interpretation of aptitude and achievement test scores, academic standing, and social adjustment. College educators have long subscribed to the principles of

training for social responsibility and for developing emotional stability, but at many colleges little has been done about it. Whether "maturing experiences" planned without objective guidance are sufficient is a question which each institution must decide in the postwar period. The wartime lessons in this area are apparent.

Military discipline is reflected in the postwar behavior of veterans. That a carry-over of wartime discipline is felt upon college campuses where veterans outnumber nonveterans is indicated by articles appearing in the press, and by a postwar study now in progress that will seek to answer the basic question whether military discipline and an appraisal of individual wartime experience affect the quality of academic work. Reports show that at campus after campus veterans have set an all-time record in punctuality, in attendance, and in scholarship. The question whether veterans are a healthy influence upon education is being analyzed by many deans who sense a quickening of the intellectual pace on their campuses. They note that the veteran has created an intense atmosphere and a change in student attitude.

From all sections come reports that veterans are more respectful, more polite, and more mature; never have there been better students than these. College teachers applaud the serious demeanor of veterans. Unless proved to the contrary, military experience has had a most salutary effect upon campus life.

Although discipline is the basis of our democratic society, the undisciplined in it resist any tendency toward loss of freedom. Actually the lessons emerging from wartime discipline do not manifest the necessity of instituting unquestioning obedience to rules and regulations; on the contrary, higher education faces the need for a reaffirmation of its aims and purposes, particularly in relation to the obligations inherent in teaching the intrinsic concept of liberty as contradistinguished from license.

Deep-rooted in the military training doctrines of both the Army and Navy are the basic principles of moral responsi-

bility. Where in civilian education we do find programs of conduct, embracing entire student bodies, that extol neatness of dress, orderliness of residence, correct posture, social consciousness, dependability, clarity of speech, and personal integrity as worthy attributes of college students? Blind obedience in civilian education is not advocated; yet citizenship in a free society is unthinkable without adherence to established laws. Certainly the responsibilities of a college instructor go beyond imparting knowledge *per se*. "We must build a nation of people who can control themselves, for until we can control ourselves, we are not safe for freedom, we are not safe for liberty." [1]

The war has given the American people an historic opportunity to judge the desirability of providing national scholarships as a permanent policy of the federal government; it has also re-emphasized the latent values in equalization of educational opportunity. The wartime college training programs developed techniques for the democratic selection of high caliber students on the basis of native ability rather than economic status. From this experience in the equalization of opportunity for higher education emerge debatable questions such as the following:

1. Must students who possess exceptional and specialized talent but reside in communities lacking publicly supported institutions of higher learning be deprived of additional opportunity for education?

2. In addition to the GI educational program and the Army and Navy ROTC programs, should the federal government finance a peacetime scholarship system for those possessing potential leadership and high intellect, in order to provide capable personnel in the vital fields of democracy and international relations?

3. Should federal funds be made available to the states as a means of expanding facilities for higher education?

It is exceedingly difficult in the United States to arouse concern among the people regarding the need for national policies in education. Following Pearl Harbor, our immediate concern

[1] State of Connecticut Document, "Report of the Board of Education to the Governor," State of Connecticut Public Document, No. 8 (1945), p. 41.

was self-preservation, no matter what the cost. Public money was provided for defense training without the slightest hesitation. Yet if legislation to provide scholarships or adult educational programs, involving an equal or smaller sum, were proposed in the Congress in peacetime, considerable debate would be precipitated in spite of the tremendous dissipation of human resources now resulting from social and economic inequalities.

The wartime college training programs, with all their democratic implications for scholarships, may eventually result in permanent provision for federal financial aid to properly qualified prospective college students. If we as a people are aware that the greatest source of wealth today is our youth, it is high time a national policy is adopted regarding equal opportunity for higher education for those who show superior talent and promise.

In an atomic age it is impossible to prophesy whether in the event of another national emergency the circumstances will permit the delay for training specialized personnel for the armed forces. The lessons of two world wars point to the imperative need for the adoption of a comprehensive and carefully coordinated peacetime reserve training program. During two world wars our country has suffered from the absence of policy effecting the proper utilization of educational resources. Our national security remains wanting unless the principal agencies —education, industry, and military—establish a planning board whose major responsibility is the national defense. This board should be invested with the authority for drafting a master blueprint which will be constantly revised in the light of international trends, and for recommending to the Congress training requirements, so that at any moment our trained manpower will be ready to function. Months of negotiating training proposals and counter proposals, characteristic of the SATC of the first World War, and the ASTP and V-12 programs of World War II will prove logistically unpardonable in the atomic era.

EMERGING PROBLEMS

The colleges and universities of America have been called upon twice in a period of twenty-five years to participate in military training programs geared to produce specialized personnel. Twice during those periods of national emergency there was absence of a blueprint or master plan for the utilization of faculties and facilities, there was confusion and delay.

The needs of the services were radically different in World War II from those of the first world-wide conflict. It is logical to assume, however, that higher education will again play an important role if this nation is faced with the need for defensive action. Should that time arrive, what then can two previous experiences teach us?

This problem was most forcefully discussed during the war by President Davidson of Knox College, who, as a member of the Council's Committee on the Relationships of Higher Education to the Federal Government, wrote:

> The first step, therefore, would be the establishment of an over-all planning board; not a struggle for authority among the American Council on Education, the Office of Education, the War and Navy Departments, but one which includes all these and more.[2]

Higher education, the armed services, industry—all have a mutual stake in technical training at the college level. It therefore becomes incumbent on these agencies to work together as a planning board in the public interest, to promote preparedness and to permit the drafting and revision of a master plan ready to function when defensive action is needed.

In the event of another national emergency, answers to the following questions should have been agreed upon cooperatively:

1. Should young men in industry be granted an inactive duty status while learning specific skills?

2. Should physically fit young men be deferred from military service and be continued in college; if so, in what fields and in what numbers?

3. Should training at the college level be solely for the

[2] Carter Davidson, "Trial-and-Error in Wartime Programs," *Educational Record,* XXIV (July 1943), 285.

armed services, or should such training be a source of specialized personnel for government agencies and defense industries?

4. Should young men under instruction be placed on active duty in uniform or be assigned as reservists on an inactive duty status?

5. Should specialized training be at individual or governmental expense?

6. Should administrative controls be a joint enterprise of the Army and the Navy or the sole responsibility of a governmental agency such as the War Manpower Commission?

7. Should there be created a system for determining the manpower needs of the nation and of the armed forces so that, in the event of emergency, an inventory can be produced with accuracy and facility?

Certainly the advances made in mechanized and atomic warfare are the catalytic agents for permanent peace and world order. Succeed or fail in the attempts, this nation cannot entertain the thought that coordinated training plans can await the outcome of a world organization. It is imperative that a master plan, a blueprint for preparation, be drawn.

Part Two

SELECTED ASPECTS OF HIGHER EDUCATION AFFECTED BY THE WAR

VII. ACCELERATION: PERSPECTIVES, APPRAISALS, IMPLICATIONS*

SHORTLY after Pearl Harbor, at a meeting held in Baltimore on January 3–4, 1942, the National Conference of College and University Presidents on Higher Education and the War went on record as recognizing "the increasing demand for men and women trained in technical skills and in professions essential to total war, and the consequent need for preparing them for such service at the earliest possible time, and . . . that basic education should be completed prior to induction through Selective Service at the age of twenty." And the conference resolved that "all institutions of higher education should give immediate consideration to ways and means for accelerating the progress of students." [1] Acceleration thus became the educational watchword of the time. Extension of the school year became almost universal practice in colleges and universities. The Educational Policies Commission encouraged the pregraduation admission of able high school students into college, and in certain places provision was made for shortening the high school program.

Now, college faculties, wearied by lengthened school years and heavy teaching loads, are on the whole eager to return to prewar programs. Acceleration seems already regarded as an isolated and temporary expedient of wartime needs. As a matter of fact, however, acceleration during the war was not an innovation, but rather the re-emergence of an educational problem of long standing and increasing importance, irrespective of the war. To see acceleration during the war period with proper perspective, and to be able to consider its implications for postwar education, it seems desirable to review briefly this history and the findings of relevant research.

A student's progress through an educational program may be expedited by various means, of which a lengthened school

* Prepared by Sidney L. Pressey, professor of educational psychology, College of Education, Ohio State University.

[1] C. S. Marsh, *Acceleration in the Colleges*, American Council on Education Studies (Washington: the Council, 1943), p. 29.

year is only one, and one of the least satisfactory. It is important that a consideration of acceleration should include all means by which it is accomplished, and broad appraisals of each. And an important allied problem concerns the age that the student should reach before undertaking various types of educational programs and age when he should complete them.

AGE AND EDUCATIONAL PLANNING

What age is most desirable for college entrance has long been a topic of debate among educators. At the 1888 meeting of the National Educational Association, President Charles Eliot of Harvard University argued that students were entering college, and beginning their careers, too old. In 1909 his successor, President A. L. Lowell, declared: "The advantages would seem to be almost wholly in favor of entering college young . . . seventeen is a more appropriate age than eighteen to begin the life of college." But to Lowell, as to Eliot, the basic issue did not concern the age at which to begin but to complete one's higher education, and his statement in this connection was emphatic:

> With the long period of special training now required in every profession, there is a universal cry that men are beginning their careers in life too old, and that the period of education is too long. Disease and death are not postponed because a man starts upon the practice of his profession a year or two later than is necessary. His period of active life, his achievements, and his usefulness are simply curtailed to that extent. . . . Much has been said about maturity, but that is the result less of age than of environment and responsibility. Maturity may easily become overripe.[2]

In 1913, Dean Henry W. Holmes found that among 5,000 Harvard undergraduates, the younger students had the better academic records and presented fewer disciplinary problems. Comparable studies at Columbia, Minnesota, Dartmouth, and Northwestern show similar results.[3] Objective test scores em-

[2] A. Lawrence Lowell, *At War With Academic Traditions in America* (Cambridge: Harvard University Press, 1934), pp. 255–56.

[3] An excellent summary and discussion of prewar work on this problem will be found in Noel Keys, *The Underage Student in High School and College,* University of California Publications in Education, Vol. VII, No. 3 (Berkeley: University of California Press, 1938), pp. 145–272.

phasized the superiority of the young students; an eight-hour battery of tests, supposedly covering the essentials of a college education, showed graduates at eighteen years of age averaging 50 percent higher than graduates at twenty-four.[4]

The danger to the young student that is most emphasized is the possible social maladjustment from his association with older classmates. More of younger than average-age students (but still only a minority) report maladjustment, especially the very young and those advanced beyond their ability. Keys found more bright nonaccelerated than accelerated high school pupils presenting personality problems. In both high school and college, younger students have been found to participate in activities, and to hold office, about as often as those of average age. In short, a considerable number of studies are in substantial agreement in showing academic gain and little if any loss in social adjustment when younger students are compared with those of conventional ages, both in high school and college.

Is the good academic record of the returned veteran a contradiction of the above conclusions? After all, it would be strange if after participation in the greatest war in history, with more varied and maturing experiences than come to most people in a lifetime, with the powerful motivations of eagerness to get into a delayed career and often the responsibilities of marriage and a family, and also with financial help from the government, he should not do well. Recent careful analyses suggest that such factors as just mentioned are probably quite sufficient to account for his good work without the inference that, in addition, a biological maturity is operative which might argue against early college work. And the relationship of age of completing education to success in career remains to be considered.

AGE OF COLLEGE GRADUATION AND SUCCESS IN ADULT LIFE

Contrary to a common notion that early college graduation is (because of initial presumed immaturity or maladjustment) a handicap to adult career, considerable scattered evidence sug-

[4] William S. Learned and Ben D. Wood, *The Student and His Knowledge* (New York: Carnegie Foundation for the Advancement of Teaching, 1938), p. 24.

gests multiple advantages from this experience. Biographical sketches show that the college graduates in *Who's Who* were on an average more than a year younger at graduation than is the average alumnus—a finding unanalyzed as to cause. An intensive study of the very complete alumni records of an eastern college shows that the youngest graduates much more often became nationally known (as evidenced, for instance, by listings in *Who's Who*) than those graduating older. Roughly comparable are more recent data which suggest that superior ability of the younger graduates is by no means the sole determining cause. A more clean-cut study compared women who graduated at the age of twenty or under from a college of education with others graduating at twenty-two, but in the same class, and paired with the younger both as to ability at entrance and academic record. More of the younger had successful professional careers.[5]

The recently published follow-up of the well-known California group of 1,400 cases (L. M. Terman and Milita H. Oden, *The Gifted Child Grows Up* [Stanford: Stanford University Press, 1947]) markedly supports the above conclusions. Most of that group were accelerated. Those who graduated from high school youngest most often graduated from college, obtained most graduation honors there, married youngest, were least often separated or divorced, and were vocationally much the most successful.

Getting established in adult life, however, involves more than lifework. As has been pointed out by Gen. F. T. Hines, "Delayed education throws the whole complex of marriage, vocation, and social life out of balance." [6] Evidence suggests that the older student rather than the younger tends to be socially and emotionally maladjusted, and to feel insecure and without the socio-economic status for which his maturity makes

[5] See, for instance, A. S. Jones, "Age at Graduation and Success in Life," *School Review,* XXXIII (1925), 184–90; S. L. Pressey, "Ages of College Graduation and Success in Adult Life," *Journal of Applied Psychology,* XXX (June 1946), 226–44; Marie A. Flesher, "Did They Graduate Too Young?" *Educational Research Bulletin,* XXIV (Nov. 14, 1945), 218–21.

[6] Frank T. Hines, "The College in Transition," *Association of American Colleges Bulletin,* XXXI (March 1945), 70–83.

him eager. Ogburn well summed up the situation almost ten years ago:

> To enter remuneratively in one's profession at twenty-five or thirty years of age is late. . . . The transition from school to occupation is probably easier at earlier ages than those of graduation today. . . . To be graduated and to enter upon a career is not, of course, to become at once self-supporting, at least on the level to which the students have been accustomed. . . . Ordinarily a young man does not marry until he can support a wife and look forward to advancement in his chosen occupation. . . . An educational program which leads to a postponement of marriage to around thirty years of age for men and several years later than the average of marriage should at least be challenged. . . . The time in life for setting up a family is a most important consideration.[7]

In short, undue delay in completion of full-time education is of advantage neither to the individual nor to society. And within the very early future, when great numbers of veterans at still older ages will be seeking a vocational start and socio-economic status satisfactory to them, and when a larger percentage of them will have family responsibilities than was found among students a decade ago, acute economic, social, and adjustmental problems may be the result.

WAR AND POSTWAR CHANGES IN SCHOOL AGES

What effects did the war have on college age? As a result of the opposition of the secondary schools, and doubtless also of parents, the number of students entering college before high school graduation seems to have been small, but the outcomes were satisfactory, as would be expected from the data on early entrance already presented. Thus, at the University of Illinois 36 carefully selected students so entered in 1943, did academic work clearly above that of the average student, showed similar superiority on a battery of objective tests, and made a satisfactory personal and social adjustment to college

[7] Quoted in *Current Issues in Higher Education*, Proceedings of the Institute for Administrative Officers of Higher Institutions, Vol. IX (Chicago: University of Chicago Press, 1937), pp. 8–10.

life. Favorable outcomes have been reported also from Pennsylvania State College and Purdue University.[8]

College entrance immediately after high school graduation (as summer entrance from high school graduation in June, and winter entrance for graduates in February) was the general practice, but seems to have had a relatively slight acceptance by colleges, and was confined mainly to the war emergency. Data regarding a total of 7,136 men and 5,932 women entering four undergraduate colleges of the Ohio State University as freshmen in a prewar, two wartime, and the first postwar academic year may be roughly indicative of what happened and is happening regarding entrance age in one large midwestern university. Entrance ages of women remained almost the same throughout. The percentage of men entering under seventeen years of age increased by 1944–45 from one to four, but dropped again in 1945–46 to one; those entering at seventeen years of age rose from 21 to 39 percent and then went down to 17 percent. Since even as late as 1944–45, 1,004 men entered (as compared with 1,737 in 1938–39), apparently entrance immediately upon finishing high school did give many young people a beginning in college; but after the war, high school boys as well as girls entered in the autumn as was customary before the war. However, by 1945–46, 1,158 men (41 percent of the total 2,824) entered as freshmen at the age of twenty-two or above, the prewar median age of graduation or older. If before the war college entrance was often later than was desirable, surely the veterans have an especial need for means whereby they can move through their academic programs faster than the usual pace. A new draft, or universal military training, would presumably also raise the question as to possibilities for academic time-saving. Means for this purpose need now be considered.

[8] Irwin A. Berg, and Robert P. Larsen, "A Comparative Study of Students Entering College One or More Semesters before Graduation from High School," *Journal of Educational Research,* XXXIX (September 1945), 33–40; W. S. Hoffman, "One Form of Acceleration: A Report," *Journal of American Association of Collegiate Registrars,* XIX (January 1944), 241–43; C. E. Dammon, "Admission without High School Graduation; with Discussion," *Journal of American Association of Collegiate Registrars,* XIX (July 1944), 471–85.

TIME-SAVING IN EDUCATIONAL PROGRAMS

It should not be forgotten that the four-year convention as regards length of college undergraduate programs has often been questioned, and that efforts have been made to change it. Back in 1876 President Daniel C. Gilman of Johns Hopkins University remarked in his inaugural address that he saw "no advantage in attempting to maintain the traditional four-year class system of the American college." [9] From its beginning in 1847 until the early 1920's Yale's Sheffield Scientific School granted the bachelor of science degree after completion of a three-year course. From 1902 to 1922 the Clark undergraduate course was three years long. And from 1883 until his retirement in 1909 President Eliot unsuccessfully worked for a three-year course at Harvard. Back in 1852 President Tappan of the University of Michigan urged completion of undergraduate work at the end of the usual sophomore year. The recent experiment in this direction at the University of Chicago is so well known as hardly to need mention.

Interest in scientific curriculum building and educational reorganization twenty years or more ago stimulated research that yielded impressive evidence of programs grossly burdened with outdated or unnecessary detail, wasteful repetition, or incoordination. In addition there was evidence of extensive overlapping of high school and college programs.

An experiment in the Kansas City Junior College showed the possibility of time-saving in this general connection. Over a seven-year period 1,226 students were admitted to a three-year junior college program and, by certain integrations of program and facilitations of progress, reached what corresponded to the usual freshman year at the average age of sixteen and a half. Even though they were about a year and a half younger, they did well on tests of academic achievement when compared with students proceeding at the more usual pace. The number who

[9] W. H. Cowley, "A 90-Year Old Conflict Erupts Again," *Educational Record*, XXIII (April 1942), 192–218.

continued into senior college, their grades, and the number obtaining degrees were all creditable to the young group.[10]

A much more flexible and readily used method which takes account of the high school-college overlapping of programs and of special ability—for example, in language resulting from travel or independent study, which is not otherwise accredited—is credit by examination. Such accrediting has long been a regular procedure in many institutions. Practical research supports the method. At the University of Illinois, almost all students who, after passing a course by examination, took further work in that subject, did well.[11] Indeed, at Ohio State University, Monroe in Romance languages and Garrett in chemistry found that those who passed a course by examination usually averaged higher grades in the next course than did those who had taken the prerequisite course. The University of Buffalo introduced the reasonable procedure that high school students planning to attempt such credit be given a syllabus of the college course concerned, sample examination questions, and opportunity to attend certain meetings in order to orient and help them in preparation for the examination. And it was found regarding those obtaining examination credit that:

> . . . the group as a whole, and particularly those who passed nine or more semester hours of work (by examination), is distinctly superior to the entire freshman class in the average grade-point status they earn; the work of the group shows a tendency to be slightly better in those fields in which the special examinations were taken than in the remaining subjects.

Reports from their instructors stated that these students "seem to suffer no disability when they begin advanced courses in college without taking the prerequisite work in the same institution."[12]

[10] L. V. Koos, "Final Report on the Kansas City Junior College Experiment," *North Central Association Quarterly,* XVIII (1943–44), 194–99.

A substantial number of experiments in secondary schools have shown that superior students put in special accelerate groups can do three years' work in two without handicap as to quality of later academic accomplishment or social adjustment.

[11] G. P. Tuttle, "Proficiency Examinations at the University of Illinois," *Journal of American Association of Collegiate Registrars,* II (1935), 55–59.

[12] H. C. Mills, "Contribution of Anticipatory Examinations," *Studies in Articulation of High School and College,* Bulletin 1, Vol. 13, Series 2 (Buffalo, N. Y.: University of Buffalo, 1936).

The prevalent method of acceleration during wartime, the extended school year, is by no means new. The four-quarter plan has a long history, and was adopted by a considerable number of institutions shortly after the first World War.

In short, efforts to shorten educational programs have a long history, have been tried from the elementary school to college, and have employed various means of selection of cases and of acceleration. In the great majority of instances results have been favorable, even where selection and means have been relatively crude. To what extent was this previous experience utilized in the educational emergency after Pearl Harbor?

WARTIME MEANS OF SHORTENING PROGRAMS

The statement made at the National Conference of College and University Presidents and quoted at the beginning of this chapter mentions accelerating student progress "through such extension of the annual period of instruction and such adjustments of curriculum as may be consistent with national needs and with educational standards, and as may be possible with available resources." A survey by the Office of Education later in 1942 showed that extensions were promptly and almost universally made: in fact only 18 percent of 947 institutions replying had retained a two-semester or three-quarter calendar with no summer session. An inquiry by Eckelberry shortly thereafter indicated that other means of acceleration were little used.[13] A simple means used was to permit or encourage students to take heavier course loads; 76 percent of 422 institutions replying on this matter recognized this method, but the number of students doing so was small. Findings show rather generally, however, that able students can well be allowed to take heavier loads than are usually permitted.[14] Increased use of credit by examination was recognized as a means of acceleration by only 13 percent of the schools, and the number of students who obtained credit by this means was small.

[13] R. H. Eckelberry, "Acceleration in College," *Journal of Higher Education,* XIV (April 1943), 175–78.

[14] F. P. Robinson, "What Is a Full Load in Academic Work?" *Educational Research Bulletin,* XXII (May 12, 1943), 113–17; C. W. Reeder, "Excess Schedules," *Journal of Higher Education,* XVII (February 1946), 99–101.

At the college level a two-semester English survey course was condensed into a four-week summer course, meeting four hours daily; the work of the students was highly favorable, and final examinations were better than among those following the regular schedule. In two universities "accelerated" sections of superior students, which met less frequently than regular sections, were found to stimulate rather than limit the achievement of their students. Also sufficient time was saved by this plan that an extra course could be taken.[15]

These plans seem to have been isolated experiments. Usually during the war period acceleration simply meant a lengthened school year. The next pertinent question is how did programs of that type which were inaugurated during the stress and confusion of a world war meet that war's needs?

EXTENT AND OUTCOMES OF WARTIME SHORTENING

How many students during the war shortened their academic programs; to what extent did they shorten them; and what effects on scholarship, and more generally on welfare and total development, were the result? Since accelerated programs in medicine were most inclusive and extensive, they may well be considered first.

By the school year 1943 practically all medical schools in the United States were on the accelerated program, "admitting new classes approximately every nine months and condensing the traditional four academic years of medical curriculum into three calendar years by eliminating summer vacations without a reduction in total classroom, laboratory, or clinic hours." As a result, by June 30, 1945, all medical schools in the United States except ten and all but four in Canada had completed a cycle of four graduating classes in three calendar years. During these three years 20,662 medical students had graduated in the United States. By comparison, 15,535 had graduated during the three years immediately preceding wartime (June 30, 1942

[15] Sister Mary Scholastica, "Experiment in Accelerated Course Work in American Literature," *College English,* IV (December 1942), 193–94; D. A. Worcester, "Adapting to Individual Differences," *Journal of Higher Education,* XVI (March 1945), 152–54; Mary Annette Klinesmith, "An Honors Seminar as a Method of Acceleration," *Educational Research Bulletin,* XXV (Jan. 16, 1946), 13–18.

and prior). The number of wartime graduates (5,127 students) over the three-year period showed an increased output of about a third. It was fairly generally agreed that:

. . . the accelerated program conducted during that time had been educationally undesirable. However, it is important to remember that factors other than acceleration itself have operated to the detriment of the medical educational program. Important among these have been the necessity for continuous teaching by most instructors. . . . To assess the educational desirability of some acceleration it is necessary to evaluate independently the various factors. . . . An uncritical urge to return to the "good old days" of the traditional calendar should be avoided.[16]

A report to the American Association of Medical Colleges declared:

It is not clear why a medical student should be able to do good work for only three-fourths of the year, and why he requires twelve or more weeks each year away from his job. There is no apparent justification for requiring a student to spend an extra nine months or a year in medical school or for an annual waste of 5,000 physician years. Immediately on graduation, the student will embark on a work program in his internship and residencies in which he will rarely have more than two weeks of respite from work. This will probably continue throughout a lifetime in the practice of medicine. There seems to be no good reason why a student, on graduation, should suddenly cease to require a three months' diversion from medicine, and abruptly become an individual requiring but two weeks. The accelerated program can allow intermediate vacation periods totalling four or five weeks. Properly spaced, this should be ample for any adult.[17]

It seems clear, however, that the extended year was undesirable for the faculty. Both student and faculty opinion appeared quite generally to be that student scholarship and student health suffered.[18] And more generally, students were opposed to the lengthened year. Thus a large and increasing proportion of premedical and medical students at Ohio State University indi-

[16] The above statements are from "Medical Education in the United States and Canada," *Journal of the American Medical Association,* CXXV (Aug. 14, 1943), 13, and CXXIX (1945), 11–12.

[17] Victor Johnson, "Effects of the Accelerated Program of Medical Schools on the Curriculum, Faculty and Students," *Journal of the American Association of Medical Colleges,* XIX (March 1944), 70–76.

[18] Nevertheless the University of Illinois reported: 19 percent less academic mortality for 1943 as compared with 1939 entrants, only one withdrawal because of ill health in the last class as compared with seven in the first, and graduation of the last group 1.98 years younger. George R. Moon, "Effects of the War Program on the Progress of Medical Students," *Journal of the Association of Medical Colleges,* XX (November 1945), 376–77.

cated on a questionnaire that they were chronically fatigued, that they had an excess of work, that they felt their education was hurried, and that the accelerated programs should be dropped. These factors as well as the reaction against wartime controls and lessened need combined to bring about a return to prewar schedules.

At the beginning of the war, colleges of engineering generally extended their school years, but since their students were not given the special draft status of those in medicine, outcomes of the program cannot be evaluated in the same way. An early study showed that the students who began engineering training in February immediately after mid-year high school graduation and continued in school through the next summer and academic year made neither significantly poorer academic records nor had higher academic mortality than the students who began in September after a summer out of school.[19] In another college of engineering, neither those attending summers nor those taking a heavier-than-average academic load showed lowered average grades. Nor did absences in certain large courses mount, which could have been expected had fatigue or ill health increased. A considerable number of students complained of limited social life, fatigue, and lack of leisure time. Seventy percent thought that acceleration should be dropped after the war.[20] More recent pollings of the judgments of both faculty and students in engineering have shown general opposition to all-year programs, the emphasis being that students need the time for professional experience as well as summer earnings, and the faculty need it for contacts with industry.[21]

In colleges of arts, commerce, education, the draft interrupted the educational plans of most men. However, for both sexes the proportion of those who graduated in less than the conven-

[19] Seymour Beardsley, Joan Schweers, and Ross Fleisig, "Evidence Concerning Efficiency of Accelerating Engineering Education," *Journal of Engineering Education,* XXXIII (October 1942), 157–62.

[20] S. L. Pressey and S. B. Folk, "First Evaluation of an Accelerated Program in a College of Engineering," *Journal of Engineering Education,* XXXIV (March 1944), 477–85.

[21] D. L. Arm, "Accelerated Programs in Mechanical Engineering," *Journal of Engineering Education,* XXXV (May 1945), 500–2; J. N. Stewart, "Returns from a Questionnaire on the Accelerated Program," *Journal of Engineering Education,* XXXVI (November 1945), 188–92.

tional time increased. Data from Ohio State University may be taken as an example. The conventional over-all time taken to obtain an undergraduate degree is three years, nine months—graduation the fourth June after entrance in September, or equivalent time for those entering in other than the autumn quarter. In the school year 1941–42, 377 women and 588 men, all of whom had had all of their undergraduate work at Ohio State University, graduated from the colleges of Agriculture, Arts, Commerce, and Education. Only 3 percent of the women and 5 percent of the men took less than the conventional time—with only 1 percent of women and 2 percent of men finishing in three calendar years or less—in spite of the fact that for more than twenty years the institution has been on the quarter plan, and had other provisions for making rapid progress possible. However, of the 385 women and 137 men graduating in 1944–45, 29 percent and 49 percent respectively finished in less than three years, nine months; 15 percent and 35 percent in three years or less, and 5 percent and 6 percent under three years.

Since the motivations and educational plans of most men students were dominated by the draft or other circumstance of the war, the accelerates were somewhat more academically able than were the nonaccelerates, and acceleration of only a quarter or two was possibly unimportant, a special study was made of the 108 women who from 1941–42 through 1944–45 had graduated in three years or less. Each was paired with another woman in the same class, college, and type of program, who had entered at the same age, and had made practically the same score on the entrance test of general ability, but had taken the usual time to obtain a degree. Superior initial preparation, study habits, and motivation of the accelerates were indicated by a superior academic record during the first three quarters. The degree of superiority was a little reduced by the senior year but still substantial; both groups were distinctly superior to the average. The student yearbook showed that the accelerates participated in activities almost as often as the control group did, and more than the average student. Inter-

views with most of the accelerates, and questionnaires filled out by most of them, as well as by large groups of other students, showed that about three-fourths of these accelerates were employed part of the time while they were in college. Almost all had had work experience at some time. Complaints of poor health, fatigue, or lack of time for social affairs were no more numerous for accelerates than for other students. In short, the large majority of accelerates seemed to have completed an undergraduate program in three years with little difficulty, maladjustment, or limiting of other desirable experience.

Two experiments in guided acceleration showed a decrease in academic mortality. Of 48 superior women who as freshmen in the autumn of 1942 decided to attempt rapid progress, initially by taking an extra course, only 38 percent had by the end of the spring quarter in 1946 dropped out of school without obtaining a degree, whereas 70 percent of a group of 61 women of about the same ability who entered at the same time but decided not to accelerate, had dropped out. The number of cases was small and special motivations doubtless operated among the group of accelerates. Nevertheless, it is understandable that a student who, because of limited funds, a desire to marry, or another special circumstance, contemplated dropping out of school would be less likely to do so if there was the prospect of earlier completion of an academic program. Similar situations might be expected to arise among veterans. Further, the academic record of the accelerates was somewhat superior as compared with the nonaccelerates; more took part in organized activities, more were employed. Six out of the 48 finished in two years and nine months, and four others received the degree in three years over-all time.[22]

Consideration so far has been primarily of certain more or less objective data regarding effects of acceleration on students as shown by the number graduated, the time taken, and academic and extracurricular accomplishment. Less tangible but

[22] First reports regarding the above study appeared in Marie A. Flesher, "An Intensive Study of Seventy-Six Women Who Obtained Their Undergraduate Degrees in Three Years or Less," *Journal of Educational Research,* XXXVIII (April 1946), 602–12; and K. M. Peterson, "An Experiment in Selective Acceleration," *Educational Research Bulletin,* XXII (Nov. 10, 1943), 211–16.

nevertheless important factors and points of view might not be revealed in such evidence. Therefore one naturally turns to the expert opinions of college and university faculties.

Most vigorous are certain reports regarding the Army and Navy training programs in the colleges—programs strictly outside the consideration of the present chapter, but probably of decided importance to faculty in forming opinions regarding intensive programs which were thought of as accelerated.[23] Heavy student loads, large amounts of material to be covered by certain courses within a short time, limited laboratory periods—all are frequently remarked upon. Accelerated programs not under control of the armed services were not thus limited or burdened, but were in a large part taught by overworked faculties to students under the uncertainties and emotional involvements of a great war. These circumstances should be kept in mind though not used to discount excessively faculty opinion. Faculty attitudes, as indicated by published matter and by informal surveys and contacts, have been described as vociferously opposed. A statement in the report of the Harvard committee on general education in a free society serves to illustrate certain of these attitudes:

> The speed-up is perhaps adapted to the acquisition of certain skills or bodies of information intended to be put to immediate use. When the aims of education cannot be stated in terms of such skills or such immediacy, the value of intensive instruction pursued twelve months in the year becomes extremely doubtful. . . .
>
> This is not to say there should be no exceptions to the four-year degree. There are students and there are circumstances for whom and under which a three-year degree should be made possible.[24]

In summary, wartime accelerated programs in American schools and colleges might be briefly characterized as follows: Almost wholly by the dogged persistence of the lengthened school year, American education increased the output of its medical schools and colleges an undetermined but appreciable

[23] See, for example, "An Experiment in Education: The Armed Forces College Training Programs," *Northwest Science,* XVIII (November 1944), 90–103, and XIX (February 1945), 13–23.

[24] *General Education in a Free Society,* Report of the Harvard Committee (Cambridge: Harvard University Press, 1945), pp. 193–94.

amount. This was undoubtedly accomplished at heavy cost to its faculties as regards health and accomplishment in scholarship and research, but with less falling off in quality of student work or harm to resilient youth than is often assumed.

In difficult professional curricula, and in accelerated programs required of all and so including marginal students for whom more-than-usual work would be a serious burden, acceleration was questioned. But almost everywhere, especially where students were selected, means for rapid progress were sufficiently varied, and programs were not too rigorous, enough students did so well as to suggest that there has existed a serious lack of opportunities for the most able to progress at what for them might well be their natural pace.

PERSPECTIVES AND IMPLICATIONS

The preceding pages have attempted to outline the various readjustments that were made to meet the war emergency, as regards the saving of time and the increased output by colleges and universities. These efforts were considered for the most part improvisations to meet a sudden need, but many comprehensive problems of long standing and of increasing importance were involved, upon which much valuable work had been accomplished over the years. And it has been felt that until wartime acceleration is seen in perspective, including such earlier and related work, neither the larger problems nor the larger possibilities for dealing with them can be adequately understood. The task now remains to make clear the larger issues and the implications for postwar education which might be especially useful. In summary, the issues might be stated as follows:

1. The war and the postwar period have brought an unprecedented wide range in the ages of students attempting higher education and in policy regarding age (from the encouragement of early entrance made during the first years of the war to the present provision for entrance of great numbers of men at ages past those which were formerly usual at graduation). Under present circumstances, an explicit and adequate consideration of the larger issue of desirable ages of completion of education seems especially appropriate, but for the most part

strangely lacking. As has already been shown, such discussion has been part of educational planning in the past.

2. Higher education in this country is now faced not only with unprecedented numbers of students, but with an unprecedented diversity as regards ability, educational and socioeconomic background, experience, and maturity. As never before, varied and flexible programs and methods are needed in dealing with the great amount of heterogeneity in the student group.

3. The major adjustment of civilian education to the war was by acceleration through extension of the school year. This type of acceleration was found dangerously burdensome to faculties. It interfered with field experience in professional training, such as engineering, and the use of vacations for travel, money-earning, or rest. In rigorous professional programs, such as medicine and engineering, the lengthened school year may have been a hazard to the health of certain students. However, where systematic studies have been made of wartime acceleration, evidence has indicated that many of the abler and more mature students found challenge and opportunity in these programs, though they were largely limited to calendar changes. In nonprofessional undergraduate programs the number benefited was sufficient to suggest a need for more widespread and greater opportunity for the ablest to progress more rapidly.

The following suggestions emerge as implications with reference to postwar education:

1. Practical experimentation before, at the beginning of, and after the war agrees in indicating that many older or superior individuals can profitably undertake college work, even without completing the usual secondary school preparations for such work.

2. The varied backgrounds and abilities found among veterans returning to school after the war have emphasized the value of tests and examinations as means for placement and for accreditation, and the need to recognize educational accomplishment through other than orthodox educational means. Prewar and wartime use and appraisal of such practices emphasize their value and the desirability of having credit by examination become a regular and accepted academic procedure.

3. Through experience during the war with lengthened academic calendars, some able and mature students found "all year" school of decided advantage. Economies in the year-round operation of school plants were evident, as also was the advantage in having vacations or other periods spent off-campus not scheduled for the same summer months. Flexible calendars, perhaps of the four-quarter type, with safeguards to prevent too unremitting work by either faculty or students, might on the whole be the most satisfactory plan.

4. Honors programs are an established feature in many institutions and, though ordinarily used for specialization and enrichment, might instead be used to aid acceleration. Special sections of large courses for superior students, and other special devices, may be used to facilitate the work of superior students.

5. It is evident that as student enrollments become larger and more diverse and programs more various, the need for guidance is increased. Unfortunate cases of acceleration would in the past have been avoided had reasonably adequate guidance programs been in use. By selecting able and well-adjusted students and using such means as mentioned above, acceleration could be used much more often than at present.

The greatest difficulty in instituting such steps as those suggested above is found in the inertia of that enormous institution known as American education, and in conventionalizing its major features with relation to the general pattern of living. The twelve years of precollege work and four years of undergraduate education are not merely features of the educational program, they are part of the basic structure of student social life as well as of the student's and faculty's mode of thinking. More generally, the literate public at large thinks of them as part of the taken-for-granted scheme of things. They are also related to sundry business procedures, such as school finances. However, as General Bradley remarked in an address to the American Council on Education, in 1946, "Where changes are required in schedules, techniques, and materials, there never was a better time to change." Courageous practical experimentation could

now introduce a new flexibility into American education, bring economies of staff and facilities, add years to careers, bring about the fulfillment of established adult life for the ablest students, and better adjust the educational program to the needs of all.

VIII. INTEGRATION OF AREAS OF KNOWLEDGE

REORGANIZATION of curriculum content to effect synchronizing and synthesis was characteristic to some extent of nearly all the armed services college instructional programs. The present chapter treats two examples, drawn respectively from the programs of the Navy and of the Army Air Forces.[1]

IMPLICATIONS FOR CIVILIAN EDUCATION OF THE NAVAL ROTC COURSE ON FOUNDATIONS OF NATIONAL POWER[2]

One product of the wartime college training program, with continuing implications for civilian higher education in the United States, is the liberal arts course generally known as Foundations of National Power. This course now exists in many different forms and with some variation of title in many of the colleges and universities having naval ROTC units. The course originated in the Navy's V-12 training program and developed as a collaborative effort on the part of the Navy and a group of civilian educators. It was initiated early in 1944. The Navy's specific purpose in sponsoring the development of this course was to stimulate in the minds of future naval officers a keener interest in world affairs, and, in particular, to broaden and to clarify their understanding of the changing international position and responsibilities of the United States.

The Navy's interest was focused on the problem of training future naval officers, but it was evident from the beginning that discussion and experimentation with respect to the teaching of international relations to naval officer trainees in civilian institutions inevitably would affect all teaching of the subject. The purpose of this report is to suggest some of these effects and

[1] Treatment of a third example, not included here, may be found in William Nelson Fenton, "Integration of Geography and Anthropology in Army Area Study Curricula," *American Association of University Professors Bulletin*, XXXII (Winter 1946), 696–706. Fuller treatment of the subject is available in Robert John Matthew, *Language and Area Studies in the Armed Services: Their Future Significance* (Washington: American Council on Education, 1947), 211 pp. Detailed study of this phase of the Army programs is reported in William Nelson Fenton, *Area Studies in American Universities* (Washington: American Council on Education, 1947), 89 pp.

[2] Prepared by Harold Sprout, professor of politics, Princeton University.

to indicate their possible implications for civilian education in the years to come.

GROWTH OF THE PROJECT

The course on Foundations of National Power was conceived from the outset as a laboratory experiment, and was started on a pilot basis at Princeton University in the March term of 1944. The pilot course was taught to a test group of fifty students enrolled in the V-12 program during the March term, and was repeated with a similar test group during the July term of that year.

On the basis of reports that evaluated the experience with this pilot course, the Bureau of Naval Personnel decided to continue the trial in several other institutions, namely, the University of California at Berkeley, the University of North Carolina, Northwestern University, the University of Pennsylvania, and Yale University. Each of these institutions introduced the pilot course and taught it to test groups during the academic year 1944–45, while the initial course at Princeton was continued without interruption.

In the light of favorable experience in these institutions, the Navy decided in the summer of 1945 to introduce a course of this type still more widely into its officer training program. Institutions having naval ROTC units were advised of this decision and were requested to offer such a course for students enrolled in the Navy training program. As a result, the course on Foundations of National Power, or an equivalent course under a different name, has been made available in many, if not in most, of the NROTC colleges and universities.

The policy of beginning on a small scale and gradually enlarging the project stands in contrast to certain other wartime training programs. This policy has had marked advantages. It facilitated the detection and correction of early mistakes. It gave time to locate and compile teaching and study materials from widely scattered sources, and to try them out in the classroom before issuing them in large editions. Perhaps most important of all, the policy of progressive extension afforded

opportunity for a small but growing group of civilian educators who were developing the course to consult frequently with each other and to pass on their experience to the teachers in the institutions that were drawn progressively into the project.

In fairness to other wartime training programs which attempted to achieve a great deal in the shortest possible time, it should be noted that the Navy's objective while sponsoring the course on Foundations of National Power was focused primarily on the postwar education of naval officers. Thus while the Navy utilized the machinery of its wartime training program to develop the Foundations course, that course never became an integral feature of wartime officer training.

This anticipation of postwar needs raised a fundamental issue. In sponsoring new trends in the teaching of international relations, the Navy moved into the sphere of general education. This innovation in its program involved problems and relationships with the colleges and universities rather different from those which they had encountered in such professional or technical courses as seamanship, navigation, or even mathematics. The course on Foundations of National Power was essentially a liberal arts course, sponsored for its assumed value in making prospective naval officers not only better officers but also better citizens.

Like most college courses in the social sciences, this course dealt with highly controversial political problems respecting which men could, and would, hold differing opinions, depending upon their knowledge, experience, and interests. Because this was true, the Navy deemed it imperative to avoid any action that could be construed as promoting or endorsing particular ideas or policies. From the point of view of the colleges, it was equally important to safeguard the traditional freedom of American higher education to teach social subjects without government interference of any kind.

The Navy met this requirement all along the line, setting precedents that seem to safeguard adequately the interests and the freedom of American colleges and universities.

OBJECTIVE OF THE COURSE

The Navy defined the objective of the course in general terms, but left the determination of ways and means completely in the hands of the teachers designated by their respective colleges and universities.

This policy took form at the outset in the exploratory conversations in February 1944 that led to the initial trial course at Princeton University. The university received no formal directive from the Navy. Instead, the director of the Standards and Curriculum Division visited Princeton and consulted informally with those members of the faculty appointed to undertake the experiment.

The Navy, it was explained, desired to stimulate the interest and to broaden the knowledge and understanding of its future officers with respect to the rapidly changing world situation and the bearings of these changes on the problem of security for the United States. To this end, the Navy desired to explore the possibility of developing instruction somewhat more broadly conceived than the usual college course on international relations or current world affairs.

Specifically, it was asked, could a course be focused effectively on the role that power (broadly conceived to include political, economic, and ideological, as well as military factors) played in international relations, in particular with reference to the problem of American national security? Could a course be organized to seek answers to such questions as: Why are some nations strong and others weak? What is the actual distribution of power among nations today? What are the long-term trends in the distribution of power around the globe? How do such facts and trends affect the problem of building a more stable international society and of achieving security for the United States within the framework of such a world order?

It was emphasized during those exploratory conversations that the Navy did not assume the competence, and did not desire, to lay down a prescribed course of study in this field. Navy policy was rather to depend upon the universities to implement the large objective in view. That policy was restated at the

teachers conferences held in September 1944, February 1945, and September 1945; it was reaffirmed strongly in a letter of August 1945 addressed by the director of training to the presidents of all NROTC institutions. That letter explained the Navy's desire to have a course of this type generally available to students in the NROTC program and stated as its aim:

> . . . to promote among the Navy's future officers a keener interest and a clearer understanding of the world position of the United States, of the problem of American security, and of the degree to which security for the United States depends upon establishing a more stable world order. The Navy does not desire to promulgate any doctrine or theory of international relations. It is our wish that the emphasis throughout should be upon the facts and situations with which our statesmen and their military advisers have to deal in formulating and carrying out the foreign policy and national defense of the United States.

SCOPE AND FORM OF THE COURSE

As a consequence of the policy just described, the course on Foundations of National Power has no officially prescribed form or scope, nor has there been any attempt to secure uniformity either in content or in presentation. Nevertheless, certain conceptions respecting form and scope have gradually emerged which, it is believed, reflect the views that are more or less generally held by those who have taught the course. The most comprehensive statement of this kind appears in the introduction to the latest edition of the outline syllabus distributed by the Navy.

> The outline rests upon the following conceptions and assumptions which are not to be regarded as the official view of the Navy, but are attributable solely to the editor in charge of preparing the outline.
>
> The outline rests upon the proposition that, in order to understand the world position and responsibilities of our own country, it is necessary to know as much as possible respecting the strength, aims, and policies of other countries. In the absence of a sovereign world government able to serve as arbiter of human relations which reach beyond the confines of a single country, the aims and policies of the various members of the society of nations, backed up by their own force and persuasion, set the pattern of international politics. For this reason the nature and distribution of political power among nations are matters of basic importance in any discussion of international relations or of American foreign policy.

That is not to imply that power is the only factor in international politics, or that power means merely armed force. The techniques for exerting influence in international situations are many and varied. Such techniques range all the way from physical coercion to economic inducements, ideological appeals, and other modes of persuasion. A nation's way of life, its ideals, its philanthropies, its intellectual achievements, the spirit of its culture, the qualities of its statesmen, and many other factors, all have a bearing upon its relations with other nations and upon the role which it can play in the world.

In the development of international situations and in the diplomacy of particular states, military and non-military instrumentalities of policy are often closely related. It is obvious that a nation's international position can be enormously strengthened or gravely weakened by changes in weapons or in the relative strength of itself in comparison with other nations. Furthermore, the possibility of violence, however remote, is a factor in every international equation, just as it is in most political situations within a single country. Thus the outline recognizes the necessity of studying both the military and the non-military factors which together determine a nation's ability to survive, to protect its national interests, and to play an active role in world affairs. From such study it should be possible to gain a reasonably accurate picture of the distribution of political power over the globe, and to perceive the bearings of these political realities on the problem of achieving security for the United States within the framework of an international security organization.

The outline is emphatic both on the importance of developing the United Nations into a successfully functioning international organization, and on the necessity of recognizing at every step the political realities upon which it rests. Statesmen cannot start with a clean slate. They must take the world pretty much as they find it. At best we can hope for no more than step-by-step progress within the existing framework of the multi-state system. But great as are the difficulties, progress toward a more stable world order has become a condition of survival in the dawning era of atomic power, not merely physical survival but also survival of the moral and spiritual values of our civilization.

This dynamic world situation has potentialities for further destruction and chaos as well as for constructive reorganization. Progress toward the latter goal will depend in no small degree upon statesmen and ordinary citizens alike achieving a clear and accurate idea of forces loose in our world and comprehending major trends in international relations. We need to know how to go about formulating adequate answers to such questions as: What has the war done to Great Britain's ability to play

her traditional role in world politics? What part can France hope to play in the emerging situation? Can the German people fill a constructive role in a new world order? Or, will Germany again become a menace and a scourge? Or will she be a dangerous pawn in a new game of power politics? Will China continue to be torn by civil strife, or will the Chinese achieve political unity in the near future and be able to assume the responsibilities of a great power in the Far East? Can a disarmed and demilitarized Japan again become a menace to other countries? By what means can Japan be transformed into a nonaggressive, law-abiding nation? How strong is the Soviet Union, and how strong is it likely to become in the near future? What do the Russians want—in Europe, in the Middle East, in the Far East? Where, and how seriously, do Russian aims conflict with our own? What is the measure of our own national strength? How has the war affected our international position? How can we achieve national security in the coming atomic age? What is our stake in the United Nations and associated international organizations?

A pedagogical approach that begins with such questions as these and proceeds from cases to principles can perhaps properly be described as inductive. The teacher employing such a method sorts out, analyzes, and evaluates the dynamic factors of international politics. In doing so he seeks further to ascertain which factors the statesman can influence in a given situation, and which ones are beyond his control. From such analyses he tries to determine what legal norms and what regulatory political machinery can operate with greatest success under existing or anticipated international conditions.

An inductive method such as this puts a heavy burden on the teacher. It requires skillful synthesis of knowledge drawn from many branches of learning. The dynamics of international relations do not fit into the conventional mold of political science, geography, or any other single academic discipline. To analyze the strength and the aims of the Soviet Union and their impact upon our own national security or upon the problem of world organization, for example, involves the integration of geographic facts, population facts and trends, estimates of natural resources,

past and prospective economic development, scientific discoveries and technological progress, the relative efficiency of different economic and political systems, the phenomena of conflicting social ideologies, the dynamics of political behavior, and still other factors. All this involves an enormous amount of data. To handle it effectively taxes the resources of the most versatile scholar and teacher. To handle it at all in the classroom requires a clear-cut frame of reference.

One method was to organize the course *topically*. A course so organized dealt systematically with the main categories of basic factors which determine the strength of nations and their ability to influence the behavior of other nations, and which condition the working of an international organization. The course took up in succession such factors as those mentioned above, using particular countries and particular international situations and relationships to illustrate the interaction of basic factors and forces. A course following this plan was developed at Yale, and a syllabus was prepared for it under the direction of Professor Arnold Wolfers.

An alternative method was to organize the course on a *geographical* or *country-by-country* basis. A course thus organized analyzed in turn the power, position, and policies of the principal nations, and also the distribution of power within particular regions and in the world as a whole. This approach has the pedagogical advantage of focusing discussion immediately on the active agents and on the specific issues of world politics. The original pilot course at Princeton employed this approach, which was tried out with good results in other institutions as well.

Few, if any, teachers have employed one approach to the exclusion of the other. In practice the two approaches have tended to merge into a single composite approach. This trend is reflected in successive revisions of the outline syllabus, in the evolution of the readings-textbooks, and in the courses that were taught in the various colleges and universities.

During the pilot stage, the course was offered on a one-term basis with approximately forty-five contact hours. This amount of time proved to be totally inadequate for the objective in view. In particular, one term allowed almost no time for ap-

plying the conclusions, reached in the study of international politics, to the high-priority problem of building a workable international security organization. For this and other reasons, the course was expanded and became a two-term course of approximately ninety contact hours. Even though it has been expanded, the course is still no more than a comprehensive introduction to the study of international relations. It does not take the place of specialized courses in international law, international organization, and so forth, but it does provide both a reasonably adequate general course for the student who goes no further with the subject and a sound foundation upon which to build more advanced and specialized studies.

Since the course has no officially prescribed form or organization, and since every teacher has been encouraged to experiment, the course in each institution has developed its own unique features and characteristics. Generally speaking, the trend seems to be toward an extended topical or systematic introductory study of the basic factors in international politics, followed by a country-by-country analysis of the power, position, and policies of the leading nations, followed by an inquiry into the problem of building a more durable international society. Such a course could be located and administered within one of the conventional university departments, such as political science, geography, and history. But the frame of reference, the study materials, and the teacher's professional competence would all have to be broader than those usually considered necessary for more conventional courses in international politics, diplomatic history, and political geography. This broadening of the study of international relations may prove to be one of the more enduring and significant results of the whole undertaking. A considerable number of American scholars in several fields and in many institutions have been stimulated to extend the area of their own interest and study, and to acquire new tools and a broader competence for dealing with the international problems of our time.

In this manner the study of international politics has been freed in some measure from the shackles of traditional academic specialization and departmentalization. The need for much

broader professional training in this field, especially at the graduate level, has been made clear and emphatic. Experience with the course has also emphasized the need for better methods and techniques of analyzing, interpreting, integrating, and synthesizing the enormous and ever-growing mass of data involved in any really comprehensive study of world politics and world organization.

TEACHING PERSONNEL

The Navy's policy was to leave the selection of teaching personnel for the course entirely in the hands of the institutions concerned. This position was set forth in the letter of August 1945, quoted earlier. The course, it was stated, is to be "taught by a civilian instructor who is a regular member of the university's own faculty." Designation of the instructor is "of course" to be "a matter for the school administrative authorities." The Navy did "not assume responsibility for locating qualified teaching personnel." But in view of the recognized "difficulties in some cases in securing satisfactory instructors at the outset," the Navy offered to furnish the names of civilian educators who "have collaborated actively in the development of the course," and who "have indicated willingness to consult with representatives of any NROTC institutions with respect to personnel or other problems arising in connection with the course."

While neither exercising nor claiming any control over the selection of teachers, the Navy candidly expressed a preference for teachers thoroughly identified with the culture and institutions of the United States. The Navy felt "sure" that the colleges would "agree" that the course "should be taught by men who combine a deep insight into and sympathetic understanding of the American political scene and the American outlook on the world."

The problem of choice of teaching personnel has not been an easy one for the colleges and universities to solve. No scholar possesses, even approximately, all the professional qualifications and competence ideally needed for a course so broadly conceived. Every teacher who has undertaken the course has had to branch out into fields of knowledge previously unex-

plored by him. Political scientists, for example, have been learning the language of geography, of demography, of social psychology, of international economics, and of other disciplines—in some instances for the first time. The same holds true among the historians, geographers, economists, and others who have taught the course. In most instances, the course has been the responsibility of a single teacher who has received aid in varying degrees from his colleagues in other departments. In a few instances, a group of teachers representing several disciplines has given the course jointly. Both methods have stimulated interdiscipline consultation and a widening of the intellectual horizon of all concerned.

ADMINISTRATION OF COURSE

Each institution has administered the course in its own way. In well over half of the colleges involved, the course has been located in either the political science or the history department. In others it has been administered in the geography or the economics department. In certain institutions the course has been offered for NROTC personnel exclusively. In others, including some of the leading universities, the course has been assimilated into the liberal arts curriculum and thrown open to all qualified students, whether enrolled in the Navy program or not.

Methods of instruction have varied considerably. In some places the course has been given largely through lectures; in others by small classes, or by combining lectures and classes. Some teachers have followed rather closely one or another of the outlines distributed by the Navy. The more general tendency, as noted above, has been for each teacher to develop his own course in which the details of organization and emphasis depend largely upon his own background, training, and experience.

TEACHING AIDS

The Navy has sponsored the preparation and distribution of several outlines or syllabi. These have served a number of useful purposes. They have indicated the objectives and broad coverage desired, as well as possible ways of organizing the

course; they have also been a vehicle for stimulating discussion of the course and for enlisting widespread aid and criticism, with a view to the progressive improvement of the course in its various forms.

These outlines, which have been the work of civilian scholars associated with the course in several universities, have been distributed to the NROTC institutions and to other responsible persons and agencies who have requested copies.[3] But no institution has been asked to use any of this material, and its distribution to students taking the course has been positively discouraged. In the introduction to the outline most recently issued, it is stated:

> The Navy does not expect teachers to regard the outline as a prescribed mold in which to cast the subject matter of the course. The outline indicates the desired breadth of coverage, and indicates also the types of subject matter involved in a course of such broad scope. The Navy hopes that the outline will prove useful to teachers giving the course, and desires them to use it in whatever way seems to them most helpful.

The first of these teaching aid outlines was prepared by the Princeton University group as part of their report on experience with the original pilot course at that university. This outline was reproduced and distributed by the Navy to the five other institutions drawn into the experiment in the autumn of 1944. A revised and expanded outline was prepared and distributed following the teachers conference in September of that year. Another outline, summarizing experience at Yale University with a somewhat different approach, was distributed early in 1945. Still another outline was issued in the summer of 1947. This outline embodies features of all the preceding outlines and, in addition, contains considerable new material and bibliographical references included at the repeated request of teachers giving the course.

STUDY MATERIALS

At the time that the experiment began, one of the most serious obstacles to giving a course of the type described in this report

[3] The Navy still has a limited stock of most of the outlines and will supply copies on request to the Director of Standards and Curriculum, Training Activity, Bureau of Naval Personnel, Navy Department, Washington 25, D. C.

was the lack of study materials in easily available form. Most textbooks on international politics were written before the war. Some of them were excellent in their day, and one or two approached the breadth of view and coverage envisaged by those who projected the Foundations course; but generally speaking, most available textbooks were either too "dated" or too narrow in their frame of reference.

There was no dearth of reading matter on national power and on the role of power in international politics and organization. Much excellent work has been done on many different aspects of the subject from the special points of view of history, geography, economics, government, psychology, but these different approaches were nowhere synthesized into a single comprehensive treatment in a form suitable for use in undergraduate courses. It was manifestly impracticable to issue to each student a hundred or more books and learned journals. If a course of the type desired by the Navy was to be given to more than a few students, either a textbook would have to be written, or some other solution to the problem of the readings attempted.

It was contrary to the Navy's policy to sponsor the writing of an official textbook in this field. On the advice of the civilian educators associated with the project, the Navy decided to experiment with a body of readings drawn from the existing literature of all relevant fields and disciplines. The aim was to fit these materials together in such form and with sufficient editorial explanation as to constitute a coherent and logical body of study materials adequate to form a solid foundation for the course. Responsibility for selection and editing was entrusted to Professor Harold Sprout, of Princeton University, who had organized and taught the original pilot course there in the spring of 1944.

A trial edition was prepared and distributed in lithoprinted form by the Navy and used in various ways in the six universities offering the pilot course during the winter term of 1944–45. These readings were revised and given a second trial in the spring term of 1945. Then, after still further revision, the readings were published in book form under the title *Foundations of*

National Power: Readings on World Politics and American Security.[4]

Every teacher giving the course has been free to use all, part, or none of the readings textbook. In actual practice, the book has been rather generally used, though there has been wide variation in the assigned reading at the different institutions giving the course.

The book, *Foundations of National Power,* differs in important respects from most readings books hitherto published. Such books in the social sciences have usually embodied a loosely organized collection of documents and other so-called source material, designed to supplement a more conventional textbook. This book, on the contrary, is itself designed to form the backbone of a course—not to supplement but to supplant the more conventional textbook.

The contents of the book are drawn from interpretive writings in many different fields and disciplines. These are carefully fitted together into a pattern intended to be as clear-cut as that of any well-organized textbook. This plan is achieved in part by selection and editing, in part by the editor's introductory essays at the head of each chapter, in part by other original writing at key points throughout the book.

COLLABORATIVE DEVELOPMENT

The course has provided unusual opportunities for constructive collaboration among scholars drawn not only from several disciplines but also from a large number of colleges and universities. This collaboration has proceeded partly by means of correspondence, partly by means of periodic conferences sponsored by the Navy for this specific purpose, partly by less formal means. Collaboration has centered chiefly on three activities: the development of outlines and syllabi, the preparation of study materials, and the exchange of information and experience gained from actually teaching the course.

The teachers conferences, sponsored by the Navy in connection with the course, have constituted perhaps the most signifi-

[4] Princeton University Press, Princeton, N. J., and D. Van Nostrand Co., New York.

cant medium of scholarly collaboration. Three such conferences [5] have been held—in September 1944, February 1945, and September 1945. The third conference had about seventy-five members, including representatives from all the NROTC institutions, the naval and military academies, the Department of State, the Foreign Service Educational Foundation, and the Council on Foreign Relations. This conference lasted three days, and the membership included some of the country's leading scholars in political science, history, geography, and other branches of learning.

The program of the conference included general discussion of the teaching of international relations under emerging postwar conditions, and sessions devoted to such special topics as the international bearings of population research, the handling of geographical data and tools in the teaching of international relations, the impact of the latest advances in science and technology, the role of ideological factors, and the handling of the subject of world organization—in general courses on international relations.

In several respects this conference was unique. Its large membership included representatives of many different branches of learning, who came from institutions located in every part of the country. They met for extended discussion of a wide range of problems involved in teaching international relations to American students. Unlike the meetings of most learned societies, this conference and those that preceded it reversed in some measure the trend toward narrow specialization. They brought together specialized scholars from many different disciplines, but all concerned with important aspects of international problems. Each made a contribution to the thinking of the others. Each found his own horizon extended and his own specialty enriched as the result.

Postconference correspondence abundantly affirms the stimulating effects and the lasting value of this type of meeting. More gatherings of this kind are needed to carry on the strug-

[5] Reports available from the director of Standards and Curriculum, Training Activity, Bureau of Naval Personnel, Navy Department, Washington 25, D. C.

gle against too narrow specialization in the study and teaching of international relations.

SUMMARY AND CONCLUSIONS

The course on Foundations of National Power was initiated to fill a need in the training of future naval officers. The aim was to awaken a keener interest and to promote a clearer understanding of the changing world position and responsibilities of the United States, of the problem of American national security, and of the degree to which security for the United States will depend henceforth upon establishing a more stable and more durable world order.

Even before the war, there was growing dissatisfaction with the formalistic and hortatory qualities that had crept into the teaching of international relations after the first World War. One product of this trend was underemphasis, if not virtual neglect, of the phenomena of power politics. More and more teachers were asking whether preoccupation with international law and international organization, sometimes to the virtual exclusion of the dynamics of international politics, really served the cause of building a durable international society. The course on Foundations of National Power has afforded a welcome and needed opportunity to reconsider the problem in the light both of past experience and of a radically new world situation.

Such an inquiry has implications reaching beyond the immediate business of broadening the education of naval officer candidates. Directly or indirectly the activities connected with the project have challenged the imagination and stimulated the thinking of teachers and administrators in many colleges and universities. There has been steady demand for successive editions of the syllabus and for the reports of the three teacher conferences. The readings textbook has been widely used in various kinds of college courses in no way connected with the Navy program.

Another significant result with continuing implications has been the impetus given to collaboration among scholars in many different disciplines. Almost for the first time, political scientists,

geographers, historians, demographers, economists, and representatives of still other branches of learning have sat down together for serious discussion and study, to define and evaluate their respective contributions to the teaching of international relations, and to seek ways and means of integrating and synthesizing their several contributions in the classroom.

The conferences, syllabi, readings, and actual experience with the course in various institutions have all emphasized the need for more broadly trained scholars and teachers. Organizing and teaching a course of such broad scope has opened up new vistas, and has stimulated the instructors as well as students to push out into new territory. Heavier demands on the teacher will put a premium on more broadly and more thoroughly trained entrants into the profession, and should thus have healthful repercussions on graduate instruction in international relations and related subjects.

All this does not imply that the Foundations course has effected or could effect all needed reforms in the teaching of international relations. Nor do the valuable results achieved with the course argue necessarily for indefinite continuance of active Navy support. The Navy has hoped and confidently expected all along that the wartime impetus thus given would carry beyond the war without continuing active support from the Navy, and that private institutions would come forward with the financial or other support needed for further stimulus and inquiry. There are heartening signs already that the impetus provided initially by the Navy has not been wasted and will not be lost, and that the goal sought by the Navy can and will be actively pursued within the traditional framework of higher education in America.[6]

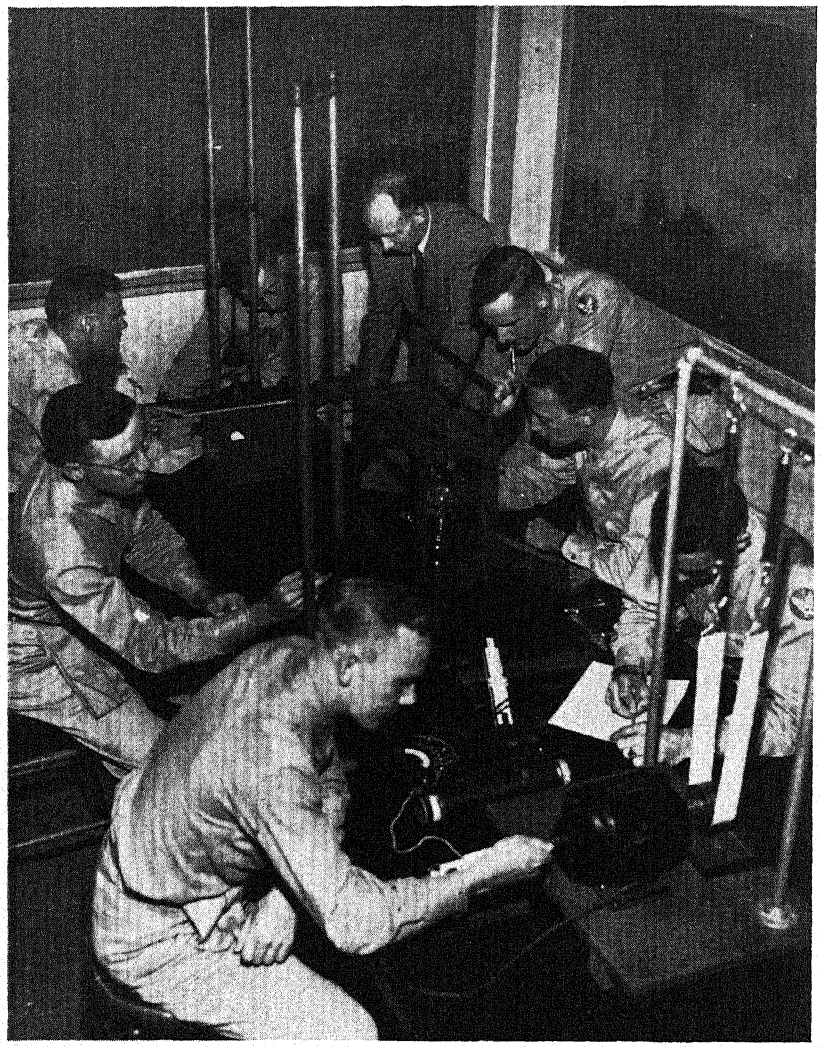
[6] One significant development along this line is the nation-wide inquiry into teaching and research in international relations, conducted in the spring of 1946 by the Council on Foreign Relations, with the support of the Rockefeller Foundation. The Council has sponsored six regional conferences of teachers and scholars. These conferences, like those sponsored by the Navy in connection with the course on Foundations of National Power, have brought together representatives of many disciplines drawn from a large number of colleges and universities. One tangible result of these conferences is the report on "The Study of International Relations in American Colleges" prepared for the Council on Foreign Relations by Professor Grayson Kirk of Columbia University (New York: Council on Foreign Relations, 1947).

PLATE V

Wesleyan University Photo

A Lecture to Navy V-12 Trainees and Civilian Students at Wesleyan University, on "The Background of the Second World War"

PLATE VI



University of North Carolina News Photo

ARMY AIR FORCES TRAINEES IN PREMETEOROLOGY AT THE UNIVERSITY OF NORTH CAROLINA

COLLABORATION OF THE ARMY AIR FORCES' PREMETEOROLOGY "C" COLLEGES [7]

All Army and Navy training was devised to produce officers or specialists and is properly judged in terms of its aims. It succeeded if the trainees proved themselves in combat or action related to combat. Incidental to training for duty, much of the Army and Navy college training has suggested to college officers methods of improving the peacetime process of education itself. With regard to the premeteorology training program, these suggestions fall into two groups: methods of improving courses and methods of improving the administration of college education. The mathematicians, the physicists, the historians, the geographers, and the teachers of English have examined and reported on the new courses which they devised for the premeteorology training program with a view to improving peacetime courses in mathematics, physics, history, geography, and English. The administrative lessons learned from the premeteorology college training program can be found in the manner in which the colleges taking part in the program collaborated.

In its final form the premeteorology course represented modifications and elaborations of curricula first outlined by members of the Kenyon College faculty. The "C" course, which was taught at first by twelve colleges, comprised new courses in mathematics, vector analysis, physics, geography, and a course combining history, English, and speech. Courses I, II, III, and IV (mathematics, vector analysis, physics, and geography) were examined by common examinations set by civilian committees of examiners and graded by them. The institutions first involved in the "C" program were: Bowdoin, Amherst, Hamilton, Haverford, Kenyon, Denison, Vanderbilt, Carleton, Reed, Pomona, Chicago, and Virginia. To these were later added: Brown, Iowa, Washington at St. Louis, California at Berkeley, and Oregon. The "C" program required twelve months and was completed at all of these institutions. An emergency program of six months ("B"), consisting of a little less than the last half of the "C" program, was taught at the following institu-

[7] Prepared by Gordon Keith Chalmers, president of Kenyon College.

tions: Brown University, Massachusetts Institute of Technology, New York University, the universities of Michigan, Minnesota, New Mexico, North Carolina, Washington at Seattle, and Wisconsin, the State University of Iowa, and Washington University at St. Louis. This chapter refers to the collaboration of the "C" institutions. The twelve-month curriculum which they taught was completed in February, March, and May of 1944. In weight, the course equalled about forty-four semester hours of work, divided about as follows: mathematics and vector analysis, twenty; physics, eleven; geography, six; English, history, and speech, seven.

The large-scale Army and Navy college training programs at the collegiate level, which were devised a few months after the premeteorology training program, were completely defined and described by the armed forces before negotiations were opened with the colleges which ultimately gave the training. In outlining the courses, both the Army and the Navy employed numerous civilian specialists, but when curricula, standards, and principles of examination were finally announced, they were handed to the training institutions ready-made.

The Weather Directorate of the Army Air Forces proceeded in a different manner. For two years before the original suggestion was made by Kenyon College, the Weather Directorate had contracted for graduate instruction of weather officers in five graduate schools: Massachusetts Institute of Technology, New York University, University of Chicago, University of California at Los Angeles, and California Institute of Technology. The faculties of these graduate schools had outlined the courses to provide the Weather Directorate with the skill necessary for the weather service. The undergraduate curriculum was devised in the same way. In the summer of 1942 certain members of the Kenyon faculty observed that the Air Forces would soon run out of young mathematicians capable of doing the weather officer graduate work. Knowing the curriculum of the graduate course ("A"), certain members of the Kenyon faculty outlined an eighteen-month course for high school graduates to prepare them for the graduate weather work. Because of the demands of the personnel flow chart, the Army Air Forces requested that

the eighteen-month course be reduced to twelve months and asked the Kenyon faculty members to work with the University Meteorological Committee in developing the course.

The University Meteorological Committee at the time was composed of the directors of the five graduate schools of meteorology. It was then expanded to include two members of the "C" colleges and one or two other teachers familiar with undergraduate scientific education. The Air Forces asked this enlarged committee to devise a method of elaborating and implementing the undergraduate curriculum. Simultaneously, the Air Forces took on its own staff as consultants a few of the members of the University Meteorological Committee and ultimately most of them, thus giving these scientists and teachers a dual responsibility, one directly to the Air Forces, and the other to the committee, which in its responsibility for undergraduate training became a contractor to the Air Forces. The committee implemented its responsibility for the undergraduate training by way of a curricular subcommittee and a curricular office established at the University of Chicago, which as an incorporated body had agreed to enter into contract for the University Meteorological Committee with the Air Forces.

Thus the responsibility for curriculum, standards, and, incidentally, a great deal of recruiting and selection, was lodged with a civilian group of scientists and teachers. The Air Forces trusted this group on the theory that out of its wide experience with research and teaching it knew more about mathematics, physics, and meteorology instruction than did any group already organized within the Army. The Air Forces were able to follow this course because many weather officers were themselves able scientists, intimately familiar with the work and standards of colleges and graduate schools. They could do it also because extensive interchange between Army and civilian personnel continued throughout the establishment and execution of the whole program.

The subcommittee on undergraduate instruction of the University Meteorological Committee called many conferences of faculty members of the participating colleges, engaged as consultants leading men in the five principal fields of the five

courses, mathematics, physics, geography, history, and English, and by extensive discussion, correspondence, drafting and redrafting, prepared the outlines, bibliographies, and schedules for five new undergraduate courses. Simultaneously with the early work on curriculum, the admissions officers of the "C" colleges met several times: first, in conference with those responsible for curriculum, in order to learn from them the academic requirements for admission to the course and, later, with the personnel officers of the Air Forces in order to develop methods of publicizing the course, interviewing candidates, and procuring the cooperation of departments of mathematics and physics in the universities and colleges throughout the country for the recruitment of some students already in freshmen classes. The admissions officers delivered to the Air Forces dossiers on several thousand high school graduates and college and university underclassmen, whose records and personal interviews indicated that they were capable of doing the work and desirous of the opportunity.

The whole task of organizing, recruiting, and activating the "C" course was accomplished between October 29, 1942, and February 15, 1943. Numerous mistakes and minor failures resulted from the haste with which all recruiting and selecting had to be done. When the recruiting effort is compared, however, with other recruiting efforts by the armed services for special training, it is generally agreed in the Air Forces that a superior job was done. The admissions officers involved are convinced that if it had not been for some of the requirements of Army practice, in many instances better choices could have been made and the whole performance of the program improved by starting with better material. Furthermore, it was the consensus even among admissions officers that the collaboration of admissions officers in the "C" institutions was nonetheless of considerable advantage to the program. Certainly this opinion was held by responsible Air Forces officers.

The significant lessons of the collaboration of the "C" colleges for peacetime education arose from their experiences in establishing and maintaining curricula and standards. Once the courses were outlined and lists of textbooks, study materials, and

sequences or problems were agreed upon, the academic directors of the "C" courses at each institution met a few times to discuss contact hours and study hours, supervised study and free study, the use of libraries, lectures, films, slides, visiting lecturers, and other instructional devices. When the military commanders of the detachments were appointed, some of them attended at least one of the meetings of directors, and there was discussion of the relation of hours of military training and drill to study. During this period, the curricular office established its ultimate organization as the registrar's office of the course. It acquired machines and equipment for extensive mimeographing and for all of the activities of a board of examiners. Its consultants began to visit the institutions where instruction had started, and during the following eighteen months there was considerable travel both from the Chicago office to the institutions and from the institutions to conferences at the office.

An initial mathematics test was set by the consultants of the curriculum office and given simultaneously in the "C" institutions six weeks after instruction started. At the end of each twelve-week term, the consultants, who had been in rather frequent conference with instructors, set examinations in four of the five courses; there were no national examinations in Course V (history, English and speech) since it proved difficult to reduce the material of that course to a machine-graded examination and since time and numbers dictated that the national examinations be machine-graded. Term examinations were given simultaneously in all the institutions on the same cycle, were graded at the curricular office, and reported upon to the institution. Eliminations from the course and graduation were based upon the results of the national examinations qualified by the opinions of local faculties.

LESSONS OF THE COLLABORATION

Several situations helped to make collaboration beneficial: a large number of students in seventeen institutions were studying a *common required curriculum;* in outlining and teaching the curriculum the institutions worked very closely together; and

these institutions, for the purpose, were not only cooperating but also competing with each other.

The benefits which are particularly noteworthy may be grouped as follows: (1) those which apply to the departmental organization of faculties, (2) those which resulted from administration of common examinations, (3) the intramural benefits accruing to each faculty, and (4) the intramural benefits to each institution.

The departmental organization of faculties

1. The intercollegiate faculty conferences were more than serious discussions of interesting problems of the subject and how to teach it. They were working conferences producing action. For the period of the course and for the purpose, enlarged departmental meetings occurred for mathematics, physics, geography, history, English, and speech. The best ideas of a dozen institutions contributed to the final practice. This collaboration of departments covered the whole process of teaching—from the point of writing the catalog through outlining, teaching the courses, examining, and grading the examinations. Small departments tend over a period of years to be restricted by the idiosyncrasies of the chairmen. This was not true of the premeteorology course. There is no proof that the course finally taught was better than similar courses regularly taught in any of the institutions, but the enterprise did require more than casual consideration of other methods and other aims by each department in each college.

2. The consultants in each subject were ultimately given large powers. The brief time available as well as the large number of institutions and students involved required that this be done. It is possible that the authority accorded the consultants was not satisfactory in all instances. Consultants were chosen by the University Meteorological Committee, not by the participating institutions. It is possible that with more time and with educational, as distinguished from training aims in view, better and more effective leadership in certain departments could have been achieved by the joint action of the "C" institutions themselves. The consultants chosen were under the same pressures to pro-

duce results as was the whole training program. The fact that they had to set standards which could be tested by machine-graded examinations considerably hampered their work. In spite of these disadvantages occasioned by the shortness of time, there was perhaps some value in recognizing the authority of an individual to summarize and state decisions which would be mandatory upon the whole group for a period of twelve months.

3. The competition of departments proved an excellent thing. This was revealed not only in an effort to score high in the examinations, but also in an effort to state the aims of the course in the best possible terms, and to deal well with the subject, independently of the examinations.

Standard examination

1. The first and most important benefit in this group was envisaged and in a small way operative, although, because of wartime necessity, it never became a reality. That all trainees in all of the institutions were preparing, not only for the same final examinations, but for the same graduate course was a benefit. Until Air Forces orders changed the plans for graduates of "C," everyone expected that all of his students would be in competition with all others for eight months in the graduate school, where all of the "C" graduates would take precisely the same course. Indeed, this expectation went a step further: successful graduates of "A" would be in competition with each other as weather officers. So everyone knew that his instruction would be judged by the performance of his own men. His performance would show up, not only in his students' ability with mathematics, physics, and geography, but also in their general ability to use the English language, to try to understand the terms of the war, and their ability as officers to lead men. Thus, not only all of the departments concerned but all of the institutions concerned, in their nonacademic as well as their academic influence upon the trainees, were in competition.

Unfortunately for the educational implications of the "C" course, the Air Forces ultimately assigned many "C" graduates to communications officer training and many to other advanced technical training, and their records are not so centralized or so

comparable as they would have been had the Air Forces continued in its original intention to give all graduates of "C" the "A" training. Evidently most of the "C" graduates did proceed to advanced technical training in the Air Forces, where their abilities and undergraduate training were put to proper use.

2. In general terms the examination was outlined before instruction began; so that all instruction was devised and executed in terms of final performance.

3. The actual examination questions were written and graded by men who had not taught the course. Thus every teacher knew that his work would be examined by someone else.

4. Institutions competed with each other in matters of more consequence than athletics and intercollegiate debates.

Intramural benefits to each faculty

1. Departments collaborated. At many places mathematicians and physicists worked as a single department, as did historians and professors of English and of speech.

2. Faculty members voluntarily decided that the collaboration would produce most effective results if they regularly visited each other's classes. New methods of instruction in mathematics and history, English and speech were devised. Mathematics lectures were given, six or seven members of a mathematics department attending most or all of the lectures of a colleague. In certain departments the lecturing was done by several members, and all of the members of a department attended most or all of the lectures. Younger members of mathematics departments learned a great deal from the more experienced members; sometimes the reverse was true. English professors attended history lectures; certain English professors were found by historians to be able to give sound and effective lectures in history; certain history professors were found by teachers of English to be able to mark themes and teach grammar, paragraphing, outlining, and the rudiments of reading and writing.

3. Like other Army training programs, premeteorology required that some faculty members teach in departments where they had never taught before. The close collaboration in

numerous faculties, including common visitation of classes, led to many important discoveries. Some physical chemists proved to be able physicists in the eyes of their colleagues in the physics department; some historians gained a new and enlarged respect for their colleagues in English; some physicists and mathematicians confirmed their old beliefs that they were not teaching the same subject; almost everyone seemed to have learned something related to teaching of allied subjects. Departmental barriers were by no means destroyed, but many doorways were cut.

4. Like numerous later specialist training programs for the Army, the premeteorology program required expansion of several departments. History and English were expanded largely by drafting from other departments within an institution; mathematics and physics were enlarged both by this means and by the addition of visiting professors. Refugee scientists figured in these departments at many institutions. For a year small physics departments were doubled and tripled; the same was true of mathematics departments. The professors concerned found this experience especially stimulating. Introduction of visitors in such large numbers, possible only under such unusual circumstances as war training, reminded us of what we already knew, that a temporary appointee doing regular course work often provides a very valuable stimulus to a department and, if he is an exceptional person, to all of his colleagues.

Intramural advantages to each institution

1. If ever an institution is tempted for financial reasons to be reluctant to dismiss students, the temptation was curbed materially by the intercollegiate competition in premeteorology "C." It was obviously to the institution's advantage to make a good showing on the national examinations and in the performance of its "C" graduates in subsequent graduate Air Forces training. A large measure of autonomy was given to each faculty in the matter of eliminations from the course. If an institution held on to its weak students for financial reasons, it jeopardized its standing in the examinations and in the subsequent performance of its graduates.

2. The extensive collaboration of departments in twelve institutions working together and of departments within each institution, and the extensive visiting of classes by colleagues within an institution, and the entertainment of consultants and other visitors from the central committee revealed to some institutions both weaknesses and strengths in their own faculty of which they had not previously been aware or of which they had not previously been convinced. Classroom and examination performance were brought out into the public light. Probably the examination performance itself, in view of the fact that the examinations were machine-graded, had less significance in this particular than the whole cooperative enterprise of redefining courses, of visiting classes, lectures, and laboratories, and of teaching a required curriculum under the direction of a faculty of twenty or more.

SUMMARY

The chief value of the collaboration carried on in the premeteorology colleges for educational practice in general lay (1) in the cooperative benefits of teaching a common required curriculum, and (2) in intercollegiate competition. The following observations should be borne in mind if a similar plan of collaboration is undertaken in peacetime for educational as distinguished from Army training purposes.

1. *A common required curriculum can be taught well by a number of faculties only if the faculties believe in it.* On the whole, the collaborating faculties believed in the premeteorology curriculum first of all because the work was required in preparation for the "A" course, which, in turn, was required by military necessity. It was not difficult to reach agreement on the essentials of the common required curriculum in view of the fact that all of the courses began at the elementary stage. Even the advanced curriculum was preparatory in the sense that it was needed higher up the scale. If the collaboration had been undertaken in peacetime, it is doubtful if agreement could have been reached as rapidly as it was. Indeed, even under the duress of war, it was necessary to cut off discussion at a certain point and lodge ultimate authority in individual consultants, whose

responsibility to act was recognized even as discussion continued throughout the first six or nine months of the course. Peacetime collaboration to produce a common required curriculum would demand a much longer period of preliminary discussion among faculties undertaking the collaboration than was permitted for premeteorology. Furthermore, those faculties would be much more likely to be able to reach agreement concerning elementary instruction than concerning advanced instruction.

Most important of all, a common required curriculum involves isolated departments in relatively small institutions in a stimulating traffic of ideas among faculties and a rewarding and pleasant kind of cooperation.

2. *A common standard examination always invites the instructor to coach his pupil rather than to teach the subject.* A machine-graded examination is particularly vulnerable at this point. Common standard examinations which require a great deal of writing rather than voting on the part of the student are expensive, because many hours must be devoted to marking them. The examination systems in British and continental universities are expensive. Though expensive, the British and European examinations are less susceptible to coaching and less conducive to it than are machine-graded examinations. But even they, over a period of many years, fall victim in some degree to this failure. On the whole, the competition among colleges of Oxford and Cambridge to score well in the examinations is healthy and tends to focus the attention of students upon the subjects which they are studying. It must be admitted, however, that rivalry among colleges and among tutors is so intense that some tutors unwittingly groom their students as for a horse race. Ultimately, one must decide whether these disadvantages outweigh the palpable disadvantages of the traditional American system of asking the instructor to examine his own students. Outside examiners for honor students and for majors standing for comprehensives in the senior year represent a compromise between the common American system and the current British one. On the side of the Oxford, Cambridge, and European practice it must be admitted that the system of visiting examiners, now many years old, has maintained a degree

of objectivity and impersonal judgment, particularly in the humanities and the social studies, which is not common in American instruction outside of the departments of science and mathematics. Our nearest approach to this on a large scale is the College Entrance Examination Board system. The collaboration of the colleges suggests an extension of some of the same principles into freshman and sophomore examinations.

For a period of eighteen months a group of American institutions teaching a restricted course for the Weather Service made a very short step in the direction of achieving some of the advantages to the students, to the faculties, and to the institutions, which are enjoyed by the faculties of the Oxford and Cambridge colleges in their federations with each other.

IX. FINANCIAL ASPECTS OF THE COLLEGE TRAINING PROGRAMS *

WHEN THE Army and the Navy recognized a definite need for a specialized training program for part of their personnel and turned to the colleges and universities of the nation as the best medium of providing this training, the question of compensation for service rendered became important. As early as 1939, when the President declared a limited "national emergency," the hue and cry was heard. It became apparent that selective service would eventually be invoked and that nearly all college students would fall within draft age groups. Thus a drastic reduction in enrollments was envisioned and consequently a decline in revenues. Nevertheless, it was obvious that not all of the approximately 1,700 colleges and universities in the nation could be made use of by the armed services.

But saving the schools from impoverishment was not the reason for designing the college training program. Nor was it designed as an experiment in education per se. It was designed specifically as an officer procurement program, to supplement the current output of officer-candidate schools; as a program to continue the training at college level of young men who, after a period of seasoning and special training, would become valuable assets to the nation as officers in the armed services. The Army and the Navy were now calling upon civilian educational resources to build the supply of trained men, just as they were calling upon civilian industries to build up the supply of materiel.

CONTRACT PROBLEMS AND RELATIONSHIP OF ARMY AND NAVY

Considerable credit belongs to the Navy for pioneering in the training of large groups of specialists at colleges and universities. Many of its experiences proved to be of great value in the events that led to the formulation of the contract princi-

* Prepared by Maj. Raymond J. Connolly, formerly chief, Training Contracts Unit, Purchase Control Section, Current Procurement Branch, War Department. The views expressed herein are those of the author in his capacity as a private citizen, and are not to be taken as officially representing the War Department.

ples which were subsequently adopted jointly by the Army and the Navy.

While the Navy used a few colleges as early as 1940, the turn of events in late 1941 and early 1942 demonstrated the need for a rapid expansion in facilities for the training of specialists. Since existing Navy facilities were unable to accommodate sufficiently large numbers for training in numerous specialized fields, the extensive use of colleges was considered to be appropriate. Training units were gradually established on approximately a dozen campuses, and as many as a thousand men were enrolled for training in radio operation, communications engineering, and several other technical fields. For the most part, the colleges merely turned over dormitories, gymnasiums, and other available buildings in which the Navy installed the necessary equipment for adequate housing and operation of the new unit. Instruction was conducted largely by military personnel, with only occasional use of members of the college teaching staff. Because the Navy utilized existing buildings and college operating and maintenance personnel, these training schools were activated within a comparatively short time. This was of great importance, since the time required to assemble manpower and critical materials to construct a training station would have meant months of delay.

There were many difficulties encountered in the joint use of a college campus. The presence of a naval installation meant a general disruption of the normal routine of college administration, and before the pecuniary features were considered by either the Navy or the school much time had elapsed. After the units were established, it became imperative that an understanding be reached as to how payment would be made. It would have been well if a sound basis of contractual relationship could have been established at the outset. Time, unfortunately, dictated otherwise; hence both the Navy and the school were compelled to depend upon faith and mutual good will as the basis for subsequent contractual relations.

Contrary to the normal concept of contracts, the factors leading to a basis for payment had to be tested, discussed, and mutually agreed upon with a sufficiently wide latitude to encom-

pass an adjustment for items of cost that could only be revealed by subsequent experience. Prior to July 1942, the usual practice in establishing a training school was merely to negotiate a standard supply contract form such as was generally used for the procurement of any other commodity or service. This procedure apparently served only as a temporary expedient in making payments to the college and was entirely unsatisfactory as a basis for a sound and uniform method of compensation.

This type of contractual relationship could not long prevail, and was necessarily considered as only a stopgap until such time as adequate steps could be taken to place contracts on a sound and uniform basis. Time passed with very little action being taken toward finding a more satisfactory plan, and the institutions became increasingly dissatisfied. Often large sums were expended from a school's operation funds with the understanding that prompt reimbursement would be made. As time passed and there was no progress in the preparation of a contract, a critical situation developed to the extent that certain colleges faced default on their payrolls and other general obligations. The seriousness of this situation prompted the business officers at various institutions to take the initiative, and present the matter to Navy officials in Washington. As a result of their action, a meeting was held in Chicago in July 1942, at which time the business officers were asked by the Navy to review the costs of operating the units in their institutions and to submit data to the Navy Department which would enable a more rational approach to be made to the matter of reimbursement for the full cost without consideration of a profit. This action constituted the first real effort to work out a sound contract procedure. Special consultants in the field of education were pressed into service, and almost immediately uniform policies and procedures commenced to take shape.

During the summer of 1942, a uniform contract document and principles for the negotiation of contracts were developed and generally accepted by the contracting institutions, although refinements and improvements were constantly being made as a result of experience gained in actual negotiations. This contract provided for reimbursement on a cost basis for commis-

sioning expense, payment for the rental or use of facilities, housing, feeding, and medical care on the basis of estimates that would subsequently be revised in accordance with actual cost experience. By the end of 1942, urgent situations were alleviated, and substantial payments were made to the colleges; thus the serious threat to interference with the training program was eliminated.

Meanwhile, as the Navy programs in colleges were constantly expanding, their experiences in contract relationship were being evaluated, and workable policies and procedures were becoming crystallized, the Army was rapidly coming to the point of inaugurating its part of an unprecedented training program in collegiate institutions. Under date of December 5, 1942, the President's Executive Order provided for the utilization of colleges by both the Army and the Navy in accordance with regulations to be prescribed by the War Manpower Commission. A committee headed by Edward C. Elliott was immediately set into motion, and practically all of the 1,700 institutions of higher learning were canvassed in order to determine their adequacy for accommodating a service training program. Screening and allocation progressed rapidly, with the result that more than 500 institutions were cleared for use by one or the other service.

Prior to this contemplated program, and in direct contrast to the Navy's method of training, the Army utilized comparatively few colleges, but rather conducted training at Army installations and industrial plants. In those colleges where it was necessary to train Army personnel, groups were comparatively small, and consequently no special considerations were necessary over and above the normal academic program of the school. Noticeable increases, however, became apparent in schools that offered courses in meteorology and related subjects, and the increased emphasis on air power prior to Pearl Harbor gradually, but very definitely, began making demands upon the colleges. On March 2, 1942, a redesignation of Army functions created an almost complete autonomy for the Army Air Forces and, in effect, created another agency competing with the Army and

the Navy in negotiations with educational institutions for the utilization of their facilities and services.

Possibly here is an instance where advocates of a unified military command might stress the advantages of having a single agency coordinate requirements and procurement. It can hardly be denied that such unification would have been ideal. In the absence of unification at the time, however, there appeared only one possible course of action in the interest of sound economy and maximum efficiency in the program that was to follow. It was only natural that the Army should avail itself of the experience of the Navy, and while there were many differences between the two services regarding the mechanics of operation and administration, the principles underlying contracts for college training as adopted by the Navy were equally useful to the Army. Now that all the services were to utilize college facilities, such a mutual endeavor seemed quite naturally to lend itself to a common ground upon which a workable contract could be made appropriate for all the forces. To this end, James A. Fowler, Jr., of the Navy Department, Captain Benjamin Kaplan of the Army Air Forces, and Major Lindner of the Army Corps of Engineers, constituting a legal unit representing all three services, provided much of the technical legal detail that was embodied in the special contract finally evolved for the college training program of both the Army and the Navy.

On February 13, 14, and 15, 1943, a conference was held in Chicago, under the auspices of the Army Specialized Training Division, the purpose of which was twofold: to develop a suitable contract form, and to develop uniform policies and procedures for publication in a manual to be followed in negotiating these contracts. Navy representatives were present by invitation, as were representatives of the Army Air Forces.

Of particular significance at this conference was the presence of eighteen business managers and controllers of some of the leading educational institutions, who were invited for the purpose of offering questions and criticisms from the point of view of the school with relation to the provisions of the contract. In effect, the eighteen representatives of various colleges and universities were asked "Here are the ideas we have developed for

contracting your schools. What do you think of them? We have no thought of being arbitrary, and thus we ask your comments and welcome your questions and recommendations."

Perhaps the remarks of Brig. Gen. Joe N. Dalton, director of personnel, Services of Supply, more forcibly illustrate this point, when he stated, prior to the adjournment of the conference:

> We have invited experts in the field from colleges who are cognizant of these details and who, I am sure, can influence, and we wish them to influence, the approach in this matter.
>
> I believe that colleges should be approached from the standpoint of liberal treatment rather than from the standpoint of tight treatment. It is not intended, of course, that contracts should be carelessly drawn, but on the other hand minor differences of opinion should not prevent a meeting of the minds. The negotiations should be so conducted that each leaves the conference after the contract is signed with the feeling that each has done a good job and that each has made a good contract. In order to accomplish this end, the negotiation must be approached in a spirit of liberality rather than the opposite.

Upon return to Washington from the Chicago conference, the Army officials immediately set about to correct a few details of minor nature in the contract form, and to incorporate into the *Negotiation Manual* the excellent suggestions made by those present. Now, apparently, both the contract form and the manual were ready to be put to the test. On February 18, 1943, three days after the end of the Chicago conference, the contract form was approved and distributed to the various service commands so that negotiations could proceed on the basis of the number of students designated to arrive at some institutions about March 1.

On March 1, the *Negotiation Manual,* as revised, was approved and circulated among the interested agencies. This manual, while constituting a step in the right direction, was not sufficiently broad in scope to cover the many different situations that arose during negotiations. It must be borne in mind that up to this time all—that is, the War Department, Navy Department, Air Forces, and the college officials—were in complete accord and eager to move ahead with plans, yet there appeared to be little more official coordination between the services than

the avowed statement that the "form of contracts and the method determining rates will be on a uniform basis in accordance with agreement reached between the War and Navy Departments." The Navy and the Army had two distinctively different organizational structures, and often one or the other utilized a school exclusively. Thus no substantial basis for comparison was available.

Officials of both the Army and the Navy were well aware that unity was essential. Of the 663 schools cleared for use by the armed services, 425 were used exclusively by one or the other group. Of the remaining schools, 83 were used jointly for medical and dental training. This left a balance of 155 schools in which contracts could be compared to insure uniformity.[1]

Navy experience had already revealed a wide variety in contract costs, which was the result of the different kinds of housing provided, the different costs of operation, the different levels of salaries. Had these differences not been subject to arbitration, to scrutiny and comparison, then the idea of uniformity would have been merely a desire and not an actuality.

THE JOINT ARMY-NAVY BOARD FOR TRAINING UNIT CONTRACTS

Cognizant of the urgent need for uniformity between the services which were to utilize the colleges and university faculties and facilities, the Under Secretary of War and the Under Secretary of the Navy on March 25, 1943, issued a joint memorandum establishing the Joint Army-Navy Board for Training Unit Contracts. The mission of this board was specifically designated as follows:

a. To approve one or more contract forms and to determine the extent to which the same shall be observed by the two departments;

b. To develop standards to be applied in determining the rates for payments for facilities and services;

c. To keep informed as to the use made of such contract forms and such standards and as to the rates established in negotiations for contracts;

[1] These statistics were taken from "List of Colleges and Universities Approved for Army and Navy Programs," (June 1, 1944). Office of the Secretary, Joint Committee Selection of Nonfederal Educational Institutions.

d. To forestall or decide any question which might arise in the course of negotiations with respect to the application of such standards, and to take other steps designed to accomplish the above purpose.

Of relatively greater importance, as subsequent events confirmed, than even the establishment of the Joint Army-Navy Board was the appointment of its initial members.[2] It is generally conceded that no man is indispensable, but if there are exceptions to every rule, then certainly the board chairman was the exception in this instance. It is doubtful that anyone could have duplicated the ability, energy, and integrity displayed by Robert B. Stewart in guiding the destiny of the three-year enterprise involving the expenditure of well above $300,000,000.

Fully aware of its responsibilities both to the government and to the contracting schools, the Joint Army-Navy Board immediately set about to adopt formally a standard form of contract, and coordinate negotiating policies which would apply equally to each service, and at the same time insure that the terms of such contracts were fair and uniform. As has already been stated, prior to the establishment of this Joint Board and in fact as far back as late 1942, both the Army and Navy operated independently in promulgating policy to govern college training programs. Fortunately, these independent operations provided the nucleus for the creation of the joint enterprise. Both agencies had developed valuable ideas that were to prove extremely beneficial in the coordination that followed.

At the time of the establishment of the Joint Board, the Air Corps had written 150 or more contracts with liberal use of so-called activating expenses, that is, expenses allowed for remodeling buildings and dormitories to accommodate a training unit. This use eventually proved extravagant and both the Navy and Army were forced to face the fact that they were following a too liberal precedent. Thus the Army's contract, in attempting to increase the efficiency of operations, provided that certain expenditures be made by the college.

[2] Army and Navy joint memorandum named Robert B. Stewart, controller at Purdue University and special consultant to the Navy Department, as chairman; James A. Fowler, Chief Counsel for the Bureau of Personnel, Navy Department; and Lt. Col. Blake R. Van Leer, chief, Facilities Branch, Army Specialized Training Division.

The colleges were, of course, of the opinion that it was unfair to ask them to spend money for expansion from which the government would receive benefit and the college suffer a loss. Now that the Joint Board was definitely an officially established organization, its prime and immediate concern was a revision of the *Negotiation Manual* to encompass the policies to be applied to these questions by all services.

On May 10, 1943, the so-called "ten commandments" were adopted and approved by both Under Secretaries. These principles of contract, which were designed to protect fully the interests of the government and at the same time to consider most carefully the interests of colleges and universities, were as follows:

PRINCIPLES OF CONTRACT

1. The definite purpose of the program is to serve the Army and the Navy. Normal functioning of the program will benefit the college by providing a paid-for utilization of its facilities and staff, but such benefit is clearly incidental to Army-Navy purposes.

2. To the extent the plant and facilities of any college or university are used especially for and as prescribed by the Army and the Navy, the college shall be left in no worse position by reason of such use. This does not mean that *all* of the institution will be maintained by the program, nor that total over-all costs will be prorated on the basis of the ratio of service trainees and civilian students.

3. The Army and the Navy, so far as possible, shall make capacity use of those facilities of the institution which are used to meet Army-Navy requirements. Activities of the program shall be concentrated as much as possible in the least amount of plant.

4. The college will not be reimbursed for any instructional or other regular operating equipment which it must acquire to provide for the training unit it has accepted, except that an allowance for depreciation will be included under costs on the basis of the uniform contract provisions.

5. Activating expense shall be restricted to (1) specialized equipment not usable by the college in its normal operations and (2) plant alterations requested by duly authorized and competent authority for the Army or Navy to meet their particular requirements.

6. The basis of the uniform contract terms is known as "budgeted cost basis," *i.e.*, the payments agreed upon are based upon a budget of expected costs predicated upon current (latest fiscal report) facts of operation, reviewed at sufficiently frequent intervals as to permit such adjustments as will correct differences between estimated costs and actual costs.

7. Whenever the service or facilities are provided particularly for or as

prescribed by the Army-Navy (for example, Ground School, A-12, V-12), the college shall be paid for its costs on the basis of the uniform contract provisions, and a fee for "use of facilities" based upon pre-war book values or cost of buildings, not exceeding 50¢ per cubic foot for the best facilities used on a capacity basis. No payment other than maintenance will be made for use of land.

8. Whenever a trainee pursues a course of study available to all students and not involving special requirements by the Army-Navy (for example, medical, ROTC), and the circumstances do not justify a cost analysis, the college may be paid the same fee for such services as it regularly is collecting from civilian students, *except* that in publicly supported institutions, the non-resident fees shall be paid for all Army-Navy trainees.

9. The college shall keep its books of account in its usual manner, except that extra records may be required to enable proper reporting upon the facts of actual financial operations. Statements of actual costs when submitted, shall be sworn to by the chief financial officer of the institution in such manner as requested. The college shall furnish proof of the facts submitted if requested to do so by the Army-Navy authorities.

10. The college shall be the prime contractor for all space and facilities for the use at the college, except that where commercial property such as a hotel is to be used, the lease shall be subject to approval of the Government and may be made directly by the Government if required by special circumstances.

Upon the adoption of these principles by the Joint Board a most decisive and beneficial conference relating to contract work was held in Omaha, Nebraska, on May 28 and 29, 1943. Broad discussions encompassing every phase of the contract program were held and policies and procedures were definitely crystallized; any skepticism entertained by either of the services or the colleges gave way to an almost complacent attitude. The Joint Army-Navy Board, however, not satisfied that the road ahead would be entirely smooth and realizing that questions involving the interpretation of principles and methods might cause considerable unrest and dissatisfaction, immediately made plans to increase its membership.

In view of the complexities and importance of the problems involved, it appeared advisable to expand the size of the Joint Board and thus obtain the benefit of the experiences and judgment of additional members and make the board more fully representative of the various educational institutions. On August 7, 1943, upon recommendation of the board, the Under

Secretaries expanded it to include three additional members.[3] It continued in operation until placed on inactive status December 1, 1945, subject to call by either Under Secretary in the event of controversy or appeal by a contracting institution. In essence, the Joint Board acted as a policy-making group and as a board of arbitration to decide controversies between the colleges and the representatives of the Army and Navy.[4]

THE CONTRACT FORM

The contract form is divided into two major subdivisions, those dealing with the operational articles and those concerned with normal mandatory contract provisions. The main compensatory articles were entitled as follows: (1) activation; (2) use of facilities; (3) instruction; (4) medical services; (5) subsistence; and (6) maintenance and operation.

Working data forms were included and annexed to the contract as a means of implementing and expanding the provisions of the basic articles. These working data forms provided for complete breakdowns of the rates chargeable under each article and provided a more complete analysis of cost figures. Each article of contract except activation was considered on the basis of "budgeted costs," that is, the negotiating officer would meet with school officials, determine an approximation of costs under the different articles, and write in such rates as were agreed upon.

These rates were subject to revision at any time upon the request of either the college or the government. For example, if the rate for instruction appeared to be excessive as compared to rates charged at other institutions, a request could be made for a review of the items leading to the establishment of that particular contract figure. If the rates based on actual experience were then found to be either too high or too low, an agreement could be negotiated amending such articles and providing for either a retroactive or subsequent revision as of

[3] Horace Ford, treasurer of Massachusetts Institute of Technology; Robert G. Sproul, president of the University of California; and Rufus C. Harris, president of Tulane University.

[4] A complete report of the activities and functions of the Joint Board may be found in the files in Current Procurement Branch, Office of the Director of Service, Supply and Procurement, War Department.

a specified date. This plan allowed both the school and the government to protect their interests within the meaning of the principles of contract. A plan so conceived was equally fair and uniform, and made it possible for the institutions to be compensated on strictly a no-profit, no-loss basis.

Activation

The first consideration before the Joint Board was the activation of the schools. Generally, activation procedures presented no serious problem, since the Joint Board was able to benefit by prior experiences of the Navy and the Air Corps, thus obviating the sanction of wholesale remodelings.

> In developing the contracting procedures, both the Army and the Navy have adhered to the general principle of trying to meet all legitimate costs of the training programs. At the same time they have felt, quite properly, that it was not their responsibility to make permanent improvements in the country's educational institutions or to provide the means for equipping colleges and universities for jobs that they were not in the habit of doing. There are undoubtedly cases in which the procedures developed are not entirely satisfactory to individual institutions; yet, on the whole, the general plan of operation seems fair to all parties concerned. As taxpayers, we can most certainly commend the care being used in the expenditure of public funds in these programs.[5]

In many cases colleges envisioned the wholesale remodeling of their facilities at the expense of the government in order to accommodate service students. This was not the intent, nor could capital improvements made at the expense of the government be justified. Rather, in making ready a given institution, expenses were restricted to specialized equipment not usable by the colleges in normal operation, and to plant alterations requested by competent authority of the Army and the Navy to meet their particular requirements.

Often schools which were eager to have a training program were not qualified to handle the numbers that they said they could handle. Rather than remodel to feed, house, and instruct the

[5] Address by President H. T. Heald, Illinois Institute of Technology, "Experience of a Technological Institute with Specialized Training Programs for the Armed Forces" in *Higher Education under War Conditions*, Proceedings of the Institute for Administrative Officers of Higher Institutions, Vol. XV (Chicago: University of Chicago, 1943), pp. 91–92.

contemplated numbers adequately, the service rejected this unit in favor of one wherein facilities were manifestly available.

Contractors were cautioned in making alterations or repairing buildings because of the limitations imposed by law relative to the improvement of private property. Twenty-five percent of the amount of compensation for use of facilities to be paid for the first year of the contract was determined as a sound basis for limitation. Any authorizations in excess of this amount necessitated special sanction by the division engineer. It was further stated that activating costs would be computed on the basis of actual costs to the institution.

In consideration of the many factors involved and the special circumstances peculiar to individual cases, it was determined that a normal maximum of $50 for each man would be used as a guide. This did not mean that an attempt should be made to spend $50 a man but rather that any cost in excess of $50 a man should be subjected to close scrutiny and review by Army and Navy officials. The ability of a college to make available its facilities and equipment as required by the Army was a prime factor in determining whether or not the institution would be utilized by the government. It was further made known that the title to the property or equipment for which payment was made by the government would vest in the government, and that the intent of the government was to remove or dispose of such property upon termination.

In certain instances colleges were willing to make expenditures which would eventually prove of benefit to the institution, and although proving a distinct advantage to the armed services program, were considered a capital improvement in which the institution would benefit by such use in its normal operation over an extended period. In such instances the government was willing to pay a use charge for such improvements based on the 4 percent depreciation on the value thereof.

It was the established policy that the contractor would proceed diligently in the performance of Article I (activation or commissioning expense) to the extent possible within a total activating expense of blank dollars which was the amount agreed

upon by the contracting officer and the contractor as reasonably necessary to cover the cost of work involved. It was further agreed that all materials, supplies, and equipment furnished, and all work done at the expense of the government would be subject to inspection and test by the contracting officer, thus allowing the contracting officer within a reasonable time to require correction or replacement of anything determined by the government to be defective. The cost of such corrections and replacements where it was not due to the fault or neglect of the contractor was to be included in the activating or commissioning expense and paid by the government.

The government agreed to reimburse the contractor for reasonable costs and expenses not in excess of the amounts stated in the contract that were incurred by the contractor directly in connection with such alterations, improvements, or equipment as were accepted by the contracting officer and upon certification that such work was done and the costs were authentic. The government made provisional payment to the contractor with the understanding that all such payments would be subject to reduction to the extent of any amounts improperly charged. Thus it was strictly a matter of making payment only for that which was actually authorized and only to the extent of the actual cost.

Prior to the making of final payment on activating costs it was mandatory that a thorough audit be made by the government. Upon determining the exactness of the work done, final payment was made and the contractor was required to deliver a release or general waiver of lien satisfactory to the government covering the items for which payment was made. Technically the government reimbursed the school for a coat of paint and technically title to that coat of paint vested in the government.

Very often the items needed to activate a school were items of standard manufacture, and items, such as double-deck beds, mattresses, blankets, kitchen and dining-room utensils, that were available in government warehouses. It would certainly have proved unwise in these instances to require the contractor

to purchase such items for the government when existing stores were available. Hence activating property resolved itself into two main categories—contractor-purchased property and government-issued property.

It was the prime responsibility of the contracting officer to cooperate in securing government property where it was obvious that a saving could be made. All government property was issued strictly on a loan basis, and records were maintained by a property officer on the campus. Lists of the items that the government could and would furnish were circulated widely so that no time was lost in determining what items would be available from this source. Other items were, for the most part, required to be purchased by the contractor and after proper approval would be paid for by the government. Dining-room and kitchen equipment were intended as items to be supplied entirely at the expense of each contract school. However, due to the limitations upon purchase of certain items and the specialized nature of certain equipment, it became necessary to recognize these as government items.

The most difficult items with regard to activating were the necessary building alterations and remodeling. Generally the standards set by colleges for the maintenance of their facilities were in accordance with normal Army and Navy standards and were more or less comparable. If the building was not suitable according to service standards it was incumbent upon the colleges to put such facilities in usable condition at their own expense, which would have been in line with the colleges' normal plan of development. Beyond that point, if something was required specifically for the military operating unit, it was considered logical that the services should pay for it.

Service standards required certain space per man in dormitories, and a certain number of shower and toilet facilities per man, whereas the normal institutional standards were not considered in the sense of student regimentation, and thus included no specific mandatory requirements. Hence additional facilities that were required and installed were definitely and fairly expenses that should be borne by the government.

At first glance perhaps the entire situation appears arbitrary. Why should the school be required to remodel its facilities only to have the government retain the title to buildings so remodeled? It was not the intent of the government to retain title or interest in any institution, nor was it intended that the added property should become a fixture or realty by reason of having been installed, but rather that such fixtures and property would be removed or otherwise disposed of upon the expiration or termination of the contract. It was the intent of the government and the contractor to be able to agree on a fair arrangement for its use by the school at such prices as would reflect a great saving to the institution.

The contractor, in effect, under Article XIII of the contract, was allowed to purchase any item of equipment utilized in this program and the government was not obligated to remove any of its property or restore the premises upon expiration or termination of the contract. There was little objection to making alterations which would prove to be a decided benefit to the institution and, as later events proved, colleges were able to purchase items of equipment from the government for as little as one-tenth of the original cost. In fact in some instances property was abandoned and allowed to remain with the institution since it was not considered profitable for the government to remove it, and thus the value of many buildings was enhanced with actually no cost to the institution.

Table 4 is a résumé of the expenditures made by the services in their major programs to cover activating or commissioning costs.

TABLE 4
COSTS OF ACTIVATING COLLEGE TRAINING UNITS

Service	Type of Training	Number of Schools	Total Expenditures	Average Cost per School
Army	ASTP	195	$ 3,442,950.39	$17,656.15
Navy	V-12	131	849,338.00	6,483.50
			3,150,662.00*	24,050.85
Air Corps	Aircrew	147	3,299,709.94	22,447.00
Total		473	$10,742,660.33	$22,711.54

* Approximation made by Navy Department representing purchases by the Navy of housing and administrative equipment for shipment to institutions.

The extent to which the services benefited by the expenditures for activation or commissioning varied in proportion to the length of time each unit was utilized. The Army Air Forces Aircrew Training Program was of relatively short duration (seventeen months only) whereas certain Army and Navy units continued operations three full years, the last two years of which saw a utilization of from 20 to 25 percent of the schools initially activated. Thus to reduce the figures in Table 4 to terms of a per-man rate based on either initial activation or extent of use would be of little consequence. It is interesting to note, however, that certain schools were able to accommodate training units without one cent of activating cost, whereas others required an expenditure of as much as $197 per man to activate a unit of 350 men.

From the experience gained, definite implications can be drawn in the event that the government should require the use of colleges and universities under similar circumstances. From the taxpayers' point of view, perhaps too much money was spent in preparing colleges for service use; but the lessons learned, particularly after the Joint Board came into operation, definitely prove that colleges can be made ready to accommodate large numbers at a minimum expense.

From the point of view of the college, it has become apparent that any proposed alterations or remodeling should be agreed upon completely at the time the contract is first negotiated in order to forestall any unwarranted expenditure resulting from the college's desire to make its facilities more attractive for government use. In 1943 many colleges acted in good faith when proceeding with improvements in accordance with their conception of what the Army or Navy required, without the specific approval of competent authorized personnel of the services. The services could not penalize them for such action, however, and they were properly compensated. Now based on these experiences the matter can be approached with a clear understanding of the problem and a mutual desire to cooperate fairly and economically.

Use of facilities

Prior to the establishment of the principles of contract considerable discussion centered on the methods to be applied in making payment for facility use. It was of prime consideration that the school should not be worse off by reason of its use by the Army and Navy, yet it was not the intent of the government to compensate on the basis of net income that the school would have derived from facilities under normal operations, rather to concentrate its activities in order to secure economical use.

Early experiences centered on two alternatives, namely, "net income" or "book value." In the early days of the program it was believed that the school should be allowed the same net income from a business enterprise that it had been making prior to the time the service programs came into operation. Others felt that conditions had changed so radically that in reality the services would be moving into vacant buildings and that the schools would not have a net income anyway. In other words, "net income" was based on the assumption that a school would continue to operate normally and therefore the services were preventing it from earning its normal net income.

It could not be considered sound or even reasonable that the government would maintain all of the institution or that the total cost to the government would be prorated on the basis of the ratio of service trainees and civilian students. There appears to be little information available as to the method of arriving at a use charge. However, considered in relation to normal practice the rate of 4 percent of the prewar undepreciated book value was sufficiently adequate to cover such situations. This 4 percent rate was generally considered as a return on capital, a cushion to absorb the shock of re-establishment and concealed wear and tear.

College buildings generally are considered as having been provided for the public interest. The theory that the institution would be "in no worse position by reason of such use" provided the basis for considerable argument. At the start of the program many schools found it necessary to move civilian students from dormitories to provide housing and messing for service

trainees. Since many dormitories and dining halls had produced profits under normal operating conditions, the colleges were in these cases allowed to base the contract rate for use of facilities on the net income previously obtained even though it might be greater than the established 4 percent of the book value of the buildings used.

In the fall of 1943, male civilian student enrollments dropped considerably and in general schools would not have been able to fill their dormitories. Also many new institutions with currently available dormitory facilities were being added to the various programs in the services. Therefore, it was believed that any charge in excess of the established 4 percent use charge was not justified. Here again the practice that was developed prior to the inauguration of the full-scale training program had to be adjusted to meet current situations without undue penalty to the colleges which had participated in the earlier program.

In determining the values of the various buildings and facilities to be used, the published reports of the institution were considered. Often book values were not available and when this was the case a fair estimate was made by determining the values of similar structures built in the locality under substantially the same conditions. In such cases the division engineer was responsible for determining the values, and approximations were made with reasonable accuracy. In the absence of definitely established values, a maximum limitation of 50 cents a cubic foot was established.

Value of grounds, roads, drill fields, and athletic fields was not considered for use charges properly attributable to the government. The maintenance of grounds generally used by trainees was considered under maintenance and operation expenses. Rates for housing facilities were computed on the basis of the prewar undepreciated book value, only to the extent of the portions thereof utilized by the services. In this connection all PWA or federal grants were excluded in determining the investment made by the institution.

Classroom and laboratory facilities situated in buildings used exclusively by the services were computed on the basis of full

valuation of the buildings. Where the services used only portions of a building and where civilian students utilized other portions, calculations were based on a percentage use by the service times the value of the building, times the percentage of use during four hours of a normal day. Four hours a day was considered the average daily use of a classroom, but if the services utilized certain rooms more than four hours a day the basis of calculating the percentage was to be changed accordingly. As an alternative means where percentages could not reasonably be applied, it was agreed that 1,200 cubic feet of space per trainee would be normally required for instruction; hence the number of trainees in attendance multiplied by the 1,200 cubic feet times the value per cubic foot (not to exceed the 50-cent limitation), times 4 percent was to equal the total annual use of facilities charged. Here again individual circumstances largely dictated the determination of an adequate rate.

Auditoriums, libraries, student union buildings, medical service facilities, administrative space, and athletic facilities were required for use by the services. In these instances, each utility was calculated on the basis of the nature of its use rather than on a percentage, since the 4 percent factor was intended in contemplation of capacity use. For example, payment for use of auditoriums or libraries being used only occasionally for meetings or lectures could not reasonably be calculated on the same basis as when they were used regularly as study halls or classrooms.

With the possible exception of computing costs for instruction, the matter of use-of-facilities computations was the most constant source of contention and discussion. In some cases fraternity houses situated on privately owned land had to be utilized, necessitating a different basis of consideration. In still other instances where campus facilities were not available, nearby hotels and other commercial property were used, and such action required special sanction by the service headquarters in order to be negotiated on lease or contract.

Subsequent changes in the manner of computing instructional

costs were later to affect the extremely complicated negotiation for use of facilities. The figures in Table 5 indicate the rates paid by the services for facilities:

TABLE 5

PAYMENTS FOR USE OF COLLEGE FACILITIES

Service	Man Months	Weighted Average per Man Month	Total Cost
Army ASTP	1,165,082	$3.81	$ 4,438,962.42
Navy V-12	1,626,738	3.31	5,384,502.78
Air Corps	857,542	3.48	2,984,246.16
Total	3,649,362	$3.51	$12,807,711.36

In spite of the difficulties experienced in this connection the rates paid to institutions for use were eventually to prove extremely economical for the government; at the same time they allowed the contractor to meet normal expenses and covered building depreciations that occurred during the war period. That the colleges were for the most part satisfied with the treatment accorded by the services in connection with payments for use is indicated by the fact that only eight requests were received by the Joint Army and Navy Board pertaining to payment of restoration of net income rather than the normal 4 percent use of facilities allowance. Three of these protests were made on the basis that 4 percent was inadequate.

It is quite naturally implied that, on the basis of only eight complaints as related to the total number of institutions utilized, the schools were dealt with fairly, and were satisfied with the end results. In the event, however, of a subsequent need for the services to repeat such a program, it is considered most desirable to attempt to simplify procedures for determining specific use of the general plant in order to align more closely the determination of rates based on more definite and serviceable records. The following quotation summarizes the general attitude of the college officials:

> And when peace comes and we settle down with a one hundred percent civilian enrollment, we shall discover that Doane has gained much from its experience with the V-12 program. In the first place, it has become

a more efficient college; the necessities of the case have demanded more strict financial accounting, closer analysis of costs, and more serviceable records. The College runs in a more ordered fashion than in the past, as would inevitably be the case with an enlarged faculty and the complex problems of military and civilian establishments. For the time being, at least, some of the old free and easy ways have had to be sacrificed.

In the second place, the faculty has become more efficient, having learned many lessons during this past year. The faculty also is more aware of its responsibility; many of its members realize that they have a share of responsibility for the present state of the world.

In the third place, the College has a better physical plant. Nearly every classroom is better lighted than before. Laboratories have been increased in number, and hundreds of dollars worth of new laboratory equipment has been purchased. The library has purchased more books than in the average year; fluorescent lights have been installed in reading rooms, and additional stacks have been built.[6]

Instruction

Computation of rates applicable to instruction was generally the most difficult portion of the training contract. The methods utilized in computing instructional costs appeared to be in a state of constant dispute. Here again the differences apparent between the services made difficult the realization of the desire that rates be made uniform.

It was the Navy's normal practice merely to take students at the particular school where they happened to be enrolled and allow them to continue the same courses that they had been taking. Unlike the Army, the Navy trainees were separated into classes and somewhat intermingled with civilian students. Also the Navy's normal academic term of instruction consisted of four months, whereas the Army curriculum specified a thirteen-week term. Payment was first made by the Navy on a "token" basis, that is to say, a nominal payment was made. This by no means insignificant payment was not necessarily intended to equal the cost of final payment. It was done with the express purpose in mind of merely estimating a rate so that the school in presenting invoices would be able to receive compensation without a long waiting period. Thus by the end of the first month the school would know how many students it had and

[6] *Doane College Bulletin*, Series XXXV (May 1944), No. 4, p. 3.

what instruction requirements were necessary. Then upon the determination of actual costs, adjustment could be made against the token payment already established, whereby the Navy would either receive a refund or would make up costs extending beyond the token payment.

The Army's much more definitive courses of study necessitated a reshuffling of instructors and classroom space. According to the Army's method of considering instructional costs, operation became more complicated. The ratio of teaching faculty and the average class hours each week were specified. For example, if trainees were to have 26 contact hours a week, the approximate number of instructors needed to teach a group of 750 trainees was computed as follows: 750 trainees divided by 30 (the average size of classes) equals 25 class sections multiplied by 26 contact hours, divided by 20 teaching class hours, equals 32.5, or 33 teachers. Therefore, if a full-time faculty were used, from 32 to 35 members should provide complete instruction for a training unit of 750 trainees. If classrooms or laboratories required a different average class size the school would require more or less instructors as the case might be.

Without going further into the Army's complex system of formulae, proportions, equations, and graphical representations, it can be plainly seen that here are factors which would tax the abilities of the most competent negotiators. Each factor was meticulously specified. Direct teaching salaries, salaries and wages of supervisors, including share of cost of the office of the dean, maintenance and repair, equipment directly used in instruction, depreciation, general university administrative overhead, and textbooks, were considered in an attempt to establish instructional rates.

Since salaries paid to instructional personnel constituted the major portion of costs in furnishing instruction, a close analysis was imperative. Because of the manpower shortage, service officials believed that faculties ought to handle more than their 1937 teaching loads. The question arose concerning what size a class ought to be for maximum results. This situation, together with the number of hours a teacher was required to

instruct, presented, not only difficulties from the standpoint of the business officers but from that of academic officials as well.

While both services continued to operate under totally different circumstances, when considered in the light of differences in curricula, the end results were fairly similar. The contractor in both instances was required to provide instruction to a designated number of trainees in accordance with a certain curriculum. Both types of contract provided that the furnishing of such instruction was to include instructional staff and supervision, equipment, instruments, supplies, and all other instruction materials generally provided by the contractor in connection with the same or similar curricula. All matters relating to such instruction—teachers and instructors, methods of instruction, size and number of classes, and supplies and equipment—were required to be in accordance with the specifications prescribed by the particular using service.

In the contract the rate for such services was stated as blank dollars for each of a minimum number of trainees as established by the count of the commanding officer. The rate as specified in the Army contract was thus more in keeping with an actual budgeted cost than was the rate originally designated by the Navy, since the Navy's rates, as mentioned heretofore, were based on a token payment subject to more definite adjustment. In reality, however, both types of contract accomplished the same purpose in that rates were eventually adjusted to provide payment based on the actual expense to the institution for all items involved in instruction.

Certain administrative differences inherent in both services made initial arrangements appear to be totally unrelated. Whatever these differences might have been they were all resolved into one final and specific conclusion: the rates paid by both services were in fact approximately uniform.

Another instance where there were differences in administration between the two services was with regard to the procurement of textbooks, manuals, instruments, and equipment. The Navy Department required the *procurement and issue* of such materials as were considered essential in connection with the

instruction and curricula referred to, reimbursement was made by the Navy and title to such property was immediately vested in the Navy. The Army, on the other hand, rather than provide for the issuance by the contractor, procured its textbooks through the contractor for delivery to the commanding officer of the training unit, who, in turn, issued them directly to the trainees as required. Here again is an illustration of how slight administrative differences, while having a minor bearing on eventual cost, ultimately were reduced to a similar result.

About July of 1944, after a year of operation under joint regulations, statements of costs were compiled by both services which revealed valuable information. At this time the Army, Navy, and Air Forces were beginning to terminate contracts, which resulted in the creation of smaller units, thus bringing about a radically different situation in many institutions where faculty and facilities would thereafter be utilized to only a part of the normal capacity. In consequence it became advisable to review the method of fixing contractual obligations under the several programs.

It was believed that the colleges would welcome the proposal of combining into one rate per man per term payment on an agreed basis for all items of contract. Complicated procedures could be eliminated, not simply for budgetary purposes to put the contracts in operation, but particularly in connection with final payments upon termination. The prospect of reduced quotas available to colleges in the educational programs of the military services was easily recognized. In view of the possibility that the budgeted cost basis of payment to colleges would not effect a proportionate reduction in total payments equal to the decrease in quotas because of the high percentage of fixed or constant cost in college operation, it seemed desirable to modify the budgeted cost basis as the principle of payment. Thus the contract pertaining to instruction was modified to provide for a new rate per man at a flat rate for the entire term as contrasted with the monthly payment under contracts then current. Sufficient information was now available to enable the contracting officers and the schools alike to arrive at fair and

equitable rates. Table 6 is a comparison of the costs based on the experiences of all services:

TABLE 6

PAYMENTS FOR INSTRUCTION

Service	Man Months	Weighted Average per Man Month	Total Cost
Army ASTP	1,165,082	$27.01	$ 31,468,864.82
Navy V-12	1,626,738	35.60	57,911,872.80
Air Corps	857,542	17.03	14,603,940.26
Total	3,649,362	$28.48	$103,984,677.88

It should be borne in mind that the apparent differences in man-month rates are not due to the fact that certain services were shrewder in negotiations but rather that different levels of academic work, and the manner in which instruction was conducted, account for these variations.

Since instruction represents the most important item to be considered in these contract negotiations, and was the item which had heretofore caused the greatest difficulty between the services and the contracting institutions, the implications to be drawn are of utmost importance. Primarily, the complicated formula for prescribing the ratio of teaching personnel to class sizes should be discarded. Then, unless a specific course of study is requested or prescribed for service trainees, the institution could maintain complete autonomy in providing the number of instructors as is its general practice under normal operations. If a school elects to conduct a mass-teaching type of schedule or prefers to conduct instruction with minimum class sizes, such action should remain a matter of individual discretion. In either event, payments by the services would be made in relation to actual costs experienced by the institution.

In considering the items that make up the rate for instruction, it is believed that a simpler approach will prove infinitely more economical. In lieu of the time-consuming analysis of the various items that were heretofore considered, and in order to eliminate the meticulous appraisal of the cost of classroom space, instructional equipment, depreciation, etc., the wisdom of adopt-

ing an alternative means becomes apparent. Since instructional salaries constitute the major portion of cost in furnishing instruction, it is suggested that a percentage of such salaries be allowed as overhead to include all other miscellaneous items directly connected with the instructional operation. A rate so agreed upon should by no means be considered as a fixed rate, but should be adjusted by mutual agreement from time to time because of the variable factors that cannot be reasonably predetermined. Occasionally, small gains might accrue to an institution, but such gain is in no way comparable to the tremendous cost involved in initial negotiations and subsequent continuous audit of cost records.

In most cases, the initial establishment of a rate for instruction could be based upon the most recent, or perhaps the previous years' experience. It is believed that such a system would provide a satisfactory starting point upon which prospective and retroactive adjustments could be made monthly or semestrally in order to reflect current cost fluctuations.

Medical services

Normally the care and treatment provided for members of the armed services is far in excess of that ordinarily received by civilians. This, of course, is because physical standards maintained by the services are different, and the possibilities of disease and infection that regimentation inflicts are greater.

The medical services to be provided by the contractor were simply and briefly set forth in working data sheets attached to the contracts. They merely stated that the contractor agreed to furnish the following services for all military personnel assigned or attached to the training unit: dispensary services, hospital service, full hospital care and bed service, laboratory service, ambulance service, and the keeping of records.

Normal college facilities ordinarily provided for some form of health service on the campus. Thus little thought was given to utilization of established Army or Navy facilities. Here again Army and Navy methods were different. The Navy provided resident naval medical officers who would hold sick

call and conduct routine physical examinations and give required inoculations. The Army placed the entire responsibility upon the school, which provided the necessary medical personnel. The question might be raised as to why in some cases adjacent Army facilities were not utilized, thus effecting a saving of the rates paid to schools. There is no reasonable answer except that a precedent had been established and the costs involved were considered too inconsequential to warrant a thorough investigation of the matter.

Competent medical authorities from the Army made inspections of college medical facilities and were able to determine a fair figure on the basis of a per-man cost for such services. An average of from $2.00 to $3.00 per man per month was considered equitable for the most complete facilities. It should be remembered that medical services as well as all other articles of contract except activation were subject to a revision of rates based on actual cost. Table 7 indicates the rates that were paid for these services.

TABLE 7

PAYMENTS FOR MEDICAL SERVICES

Service	Man Months	Weighted Average per Man Month	Total Cost
Army ASTP	1,165,082	$1.88	$2,190,354.16
Navy V-12	1,626,738	1.42	2,309,967.96
Air Corps	857,542	1.77	1,517,849.34
Total	3,649,362	$1.65	$6,018,211.46

Based on the experience gained regarding medical service facilities in the event that future needs should arise, it is believed that conveniently available facilities maintained by the services should be utilized to the maximum. This does not mean that services rendered by the institutions were not entirely satisfactory, but rather that medical service facilities and the rendering of service by the school did not operate to the financial advantage of the institution nor were the facilities established at the school of any intrinsic value in the course of their normal peacetime operation.

Subsistence

Subsistence, which cost more than any other item of contract—in fact almost as much as the entire balance of the contract combined—was a comparatively new experience in many instances. A good many schools which had had no such previous experience were consequently reluctant to commit themselves as to what might be a reasonable figure in the preparation of a subsistence budget. Both the Air Force and the Navy prior to the V-12 and ASTP ventures had had some experience with such costs. These experiences again operated to the distinct advantage of the Army in that it profited from them. This item happens to be one which was given little consideration in the sense of being figured to the last penny, yet by simple mathematics one can realize that for 300,000 men in the service program, one or two cents a day might result in a tremendous leverage at the end of the year.

This particular section of the contract, plus the cost of instruction, represents about 75 percent of the entire contract costs and comprises the area in which the school can operate profitably or lose money to a serious degree during normal operations. The possibility of extremely wide variation between different schools was taken into consideration and also the possibility that considerable savings could be passed along to the training units as to ways in which messing might be handled when applied to the contracts. All the factors were set forth in a clear and concise manner. The contract articles stated:

> . . . the contractor will provide and serve three meals per day to the trainees at the training unit but not to exceed (a specified number) at any one time. The hours during which meals are served shall be specified by the commanding officer of the training unit and the quality, quantity, and type of food and the purchase, preparation, and serving thereof will comply with service standards. The government will pay the contractor compensation for subsistence at the rate of blank dollars per day for the number of men reported by the commanding officer to the contractor to be on rations.

Spaces were provided in working data forms for a completely analytical estimate based on salaries and wages, current repairs and maintenance, utilities, telephone and telegraph, insurance,

operating supplies, laundry and dry cleaning, small equipment replacement, depreciation, administrative expense, and cost of raw food. A practical means of establishing raw food cost, which normally approximated about 68 percent of the cost of messing, was accomplished by analyzing typical menus in collaboration with the institution's director of dining halls.

Fortunately the item of subsistence, while representing almost half of the cost of the entire contract, presented few negotiating problems. In contrast to academic procedures, the service negotiators could take the initiative, having had considerably more experience in the field of group feeding techniques. Recorded experiences indicated the small range of from 66.5 to 74.3 percent in costs of raw food, from 16 to 29 percent for labor, and from 10 to 15 percent for utilities, depreciation, and general administrative expense. Thus a general formula could be utilized in the preparation of a messing budget. This formula, while not constituting a hard-and-fast rule, was eventually to prove effective in establishing uniform rates. Standards required by certain commanding officers were found to vary widely even in similar locations, and consequently the cost of raw food would vary even within the same area. Costs of mess management and labor were very often found to be out of proportion under almost identical situations. Thus the college officials and the service negotiators could review all the items of messing cost to the end that maximum efficiency could subsequently operate to mutual advantage. Once these budgets were reasonably established, the changing conditions could readily be adjusted at the end of each ninety-day period, at which time definite audits were made.

Some messes were conducted only slightly within service standards whereas others were more liberal in prescribing the quantity and quality of the food served. Efficiency in purchasing and preparation also had considerable bearing on final costs. However, considering the human element, the end results were surprisingly uniform. By and large food costs varied, depending upon the geographic areas. The West Coast and the Northeast were generally high as compared to the South and South-

west. Table 8 indicates the variations in cost of subsistence in relation to geographic areas.

TABLE 8

PAYMENTS FOR SUBSISTENCE PER MAN DAY: HIGH, LOW, AND AVERAGE, BY AREAS

AREA	HIGH COST		LOW COST		AVERAGE*	
	Raw Food	Total	Raw Food	Total	Raw Food	Total
New England	$ .85	$1.25	$ .70	$1.00	$ .793	$1.200
New York–Pa.	.85	1.30	.64	1.05	.777	1.144
Southeast	.84	1.23	.59	.93	.725	1.068
North Central	.84	1.16	.59	.91	.722	1.055
Southwest	.78	1.10	.62	.92	.695	1.038
West Coast	.88	1.38	.58	.93	.754	1.203

* Average based on review of contract rates by areas, not on arithmetic average of high and low.

In cases where messing was a completely new venture for the institution, valuable assistance was offered by the Quartermaster Corps of the Army or by the Navy Messing Officer of the naval district, who in practically all cases exercised a guiding hand in the matter of service standards, menu construction, methods of buying, and sanitation. Cooperation by the Army sometimes extended to making available food supplies from government-issue stores to both Army and Navy units.

Occasionally problems were created with regard to adequate facilities. Mess halls were frequently located in the dormitories or adjacent buildings. In such cases, the use charges, having already been computed for the building as a whole, were not separately estimated for the dining room and kitchen facilities.

It has been pointed out that the messing rate was on a per capita basis, whereas other contract rates were on the monthly or term basis. The reason for this is that the cost varies with the number of individuals, and even minor variations during a longer period than one day result in a tremendous change both in the preparation of raw foods and the daily cost of operation. In certain schools facilities were not available; therefore private caterers or restaurant suppliers were subcontracted. This arrangement presented a problem since the element of profit was obviously essential to such enterprises, proving difficult from

the standpoint of auditing and adjusting rates in proportion to the costs of services being rendered.

TABLE 9

PAYMENTS FOR SUBSISTENCE

Service	Man Months	Weighted Average per Man Month	Total Cost
Army ASTP	1,165,082	$33.80	$ 39,379,771.60
Navy V–12	1,626,738	33.60	54,658,396.80
Air Corps	857,542	30.70	26,326,539.40
Total	3,649,362	$32.91	$120,364,707.80

The implication to be drawn in connection with feeding furnished by colleges and universities is certainly clear and decisive. The manner in which messing was handled is noteworthy and impels commendation to the contracting institutions. It was an entirely new venture for some schools, and experiences, while definitely minimizing costs for subsistence to service students, provided the school with a thorough knowledge and experience in feeding techniques to the end that their peacetime operation will be conducted on a more profitable basis. From the point of view of the services they have only to make comparison between the $1.80 a day paid as commutation in lieu of ration (as in the case of medical students) as against the average rate obtained under the contract. It is further of considerable importance that since the cost of messing represents the major portion of college training, schools which cannot provide messing services should not be considered as potential training establishments, thus eliminating undesirable subcontracting.

Maintenance and operation

The item maintenance and operation was of great importance from the standpoint of the school in arriving at an understanding of the maintenance involved in proportion to the facilities actually utilized by the services. Here again the principles of contract were of major importance in arriving at sums to be paid for maintenance and operational costs.

Based on this theory the contractor was required to provide

light, heat, water, power, janitorial services, and all other supplies for the operation and maintenance of the property and facilities used by the training unit, for a capacity of a designated number of men and in accordance with the requirements of the services. For the performance of these services, a contract rate was established on the basis of so many dollars a month, commencing with a specifically designated period. These estimates were determined on an annual basis and the annual sum was reduced to a monthly amount to be stated in the contract.

To the greatest extent possible the published financial reports were considered in determining cost estimates. However, elements of year-around operation and more intensive use were also carefully considered. The working data forms annexed to the contract were inclusive and covered practically all the factors involved in adequately arriving at budgeted cost figures. This article, representing the third highest item of cost, required careful study, and contracting officers were cautioned to exercise meticulous care in properly setting forth costs applicable to each facility utilized. As usual, questions arose with relation to special circumstances peculiar to an individual institution.

The care of the campus, laundry and dry cleaning, taxes, libraries, athletic facilities, normal and irregular repairs and maintenance, and insurance presented individual problems, yet all items of maintenance and operation were reasonably and honestly considered to the end that mutual satisfaction was ulti-

TABLE 10

PAYMENTS FOR MAINTENANCE AND OPERATION

Service	Man Months	Weighted Average per Man Month	Total Cost
Army ASTP	1,165,082	$9.00	$10,485,738.00
Navy V–12	1,626,738	6.29	10,232,182.02
Air Corps	857,542	8.55	7,331,984.10
Total	3,649,362	$7.68	$28,048,904.12

mately obtained. As the programs progressed the experiences gained by the services were of considerable value in subsequent

reviews of costs. These experiences were of similar significance in that they enabled a comparative analysis to be made, thus providing reviewing authorities with definite evaluation that could be conveniently utilized in the establishment of more definite policies.

As had been the experience in computing other articles of the contract, maintenance and operation required close scrutiny of past records of the institution. The initial establishment of rates was extremely difficult in itself, and so subsequent revisions and adjustment of these rates were not only beneficial to the services in determining more uniform rates, but were even more beneficial to the schools in enabling them to realize the importance of adequate and thorough financial records.

It is considered a conservative estimate that not more than 10 percent of the colleges had records as complete as the services demanded. In some cases, in fact, the status of financial records was deplorable. In future years, improvement in the efficient and economical operation of certain educational institutions will probably be attributable to the experience gained by having had a training program.

Revision of rates

The article of contract known as "revision of rates" is perhaps the most important and most conclusive article of the contract. To know this article completely is to understand the contractual relationships between the services and the colleges. The contract form is extremely simple, yet it has internal latitudes and flexibilities within the revision of rates article designed to make possible adjustments in a wide variety of situations.

The demand for revision might be made either by the contractor or by the government within a period of thirty days after the expiration of each three months, and any rates so revised might be made retroactive to any period covered by the contract and would continue in effect until a subsequent revision was made in accordance with future demands of either party. In the event contracting officers and school officials were unable to agree on the revised rates, the Secretary of War or the

Secretary of the Navy was to have full authority to determine the revised rates and the effective dates thereof.

The agreements to revise were stated in the form of a supplemental agreement to the existing contract. It was not necessary to revise all articles of contract, and, for example, if both parties were satisfied with the rates set forth under everything except the messing cost, supplemental agreements could be drawn to the contract providing for that one revision only.

This article also contained an important connection with Article XV, entitled "Records," which dealt with financial statements required of the contractor. It provided that the contractor might fix the time at which the institution should furnish such statements. Here again is an example of how some of the demands of the government, while perhaps appearing arbitrary, aided the institutions in accumulating and maintaining proper records. Table 11, taken from Army records, shows the revision in contract rates and the trend in the direction of more accurate budget estimates.

TABLE 11

ESTIMATED AVERAGE COST PER TRAINEE PER YEAR BASED ON ALL CONTRACTS (EXCEPT MEDICAL, DENTAL, AND VETERINARY), REVISED AS OF GIVEN DATES

Curriculum	1 Aug. '43	1 Sept. '43	1 Oct. '43	1 Nov. '43	1 Dec. '43	1 Jan. '44	1 Apr. '44
STAR	$ 833.62	$ 794.92	$ 768.81	$ 753.31	$ 720.99	$ 707.47	$ 719.30
Basic engineering	1,015.38	973.49	964.79	939.73	932.66	926.38	918.86
Advanced engineering	1,209.17	1,185.11	1,166.32	1,109.34	1,103.80	1,092.36	1,049.24
Personnel psychology	1,085.62	1,085.62	1,064.90	1,081.90	1,059.80	1,063.64	1,064.55
Area and language	1,333.35	1,214.08	1,207.22	1,206.54	1,173.53	1,170.86	1,167.93

Scrutiny of Table 11 reveals that initial budget estimates were liberal and that as the months passed gradual decreases were noticeable. These decreases were due to rate revisions and also were effected by the gradual increase in enrollment which reached a peak in December 1943. With the curtailment of the program in March 1944, subsequent cost compilations revealed a trend upward arising from drastic reductions in attendance, which resulted in higher per-man costs. It is evident that facilities

were more practicably and economically utilized where larger groups were involved.

TERMINATION AND PROPERTY DISPOSAL

At the beginning of the program it was anticipated that college facilities would be utilized for a comparatively lengthy period since all indications pointed to a long conflict. However, the successes of our military forces and the urgent need for more effective concentration of military strength on all battle fronts resulted in a drastic reduction in the program before the operation had been in effect a year. The Army reduced its enrollment in schools from approximately 145,000 to about 35,000 students, thus obviating the need of using many schools. Meanwhile the Navy's enrollments remained fairly constant, while the Air Corps experienced a drastic curtailment of its training program which resulted in the complete termination of aircrew training by July 1944. Machinery had to be set in motion immediately to consider the problem of termination and to make adequate provision for the disposal of property which had in many instances only recently been acquired.

While the original contract contained an article relative to termination, that provision contained only the mandatory requirements covering the rights and obligations of both parties and a statement to the effect that in the event of such termination the contractor and the government would put forth their best efforts to mitigate any losses in connection with such termination. Likewise Article XIII provided generalization as to the intent of both parties with regard to the disposition of property acquired under the terms of the contract and also provided an option to purchase such property as may have been utilized.

Now that the program was declining rapidly, special policies and provisions had to be drafted. Specific rules were made and approved by the Joint Army-Navy Board on March 7, 1944, and a standard form of supplemental agreement was provided in order to maintain uniformity in adjusting rates of compensation and to adhere to established government policy with regard to property disposition.

The details connected with creating the termination policy were as involved as was the initial creation of contract policies and procedures. The factors considered in establishing termination policy are too voluminous for complete discussion here, but it can safely be stated that such policies were conceived and carried out in keeping with the spirit of the principles of contract. Many institutions profited considerably by reason of the alterations and the improvements initially made.

INITIATION OF FLAT RATE FOR INSTRUCTION

During the latter part of 1943, experiences resulting from the actual operation of the programs were tabulated in order to make a close analysis of them for the purpose of determining the effects of established negotiation procedures. Requests were made to all services for compilations of cost figures in order that these comparative studies could be made. Upon the receipt of financial reports from all services, the Joint Board, at the request of the Chief of Naval Personnel, appointed a subcommittee to consider the recommendation that consideration be given to revising the form of training contract to permit the fixing of a fee for instructional costs in lieu of attempting to adjust such payments on an actual cost basis.

The resulting discussions revealed that many schools had had considerable difficulty in obtaining academic costs and protested against the laborious and expensive accounting entailed. Based on cost reports and exchange of experiences, it was the opinion of the Joint Board that institutions should recommend a fixed fee per man based on a term payment. Accordingly it was voted that the subcommittee explore the subject fully and report its investigations. Sufficient experience had been gained by this time to warrant a most thorough study, thus definitely establishing the fact that tuition fees as such at the various institutions bore little if any relation to the cost of the particular services and facilities of the institutions that were to be used in the program, and that the institutional accounts gave insufficient information to serve as a basis for building up any satisfactory rate

that would represent these costs. Costs had to be arrived at the hard way, hence the "budgeted cost basis."

Normal institutional accounting apparently provides no distinct relation between instructional costs and costs for the use and maintenance of living quarters and dining halls, which are normally accounted for separately in college accounting. The conclusion was reached that revising the rate of instruction to a "fixed fee" would have definite bearing on charges for the use and maintenance of academic facilities. It was further emphasized that it appeared inadvisable to include in this instructional rate the separate cost items in college accounting, since they were mingled with the cost of operating other facilities. It was recognized that the prospect of reduced quotas would effect a proportionate reduction in total payment to the colleges based on a budgeted cost basis. Therefore, it seemed desirable, as regards instruction, to modify the budgeted cost basis as the principle of payment.

It was not the intention of the armed services to take advantage of the lowest unit costs that were obtainable when, with normal or slightly reduced civilian attendance, there was a full utilization of the instructional facilities and personnel of the school. Due consideration was given to this aspect of the unit operation in fixing the new rate. The institutions derived benefits from the full or partial use of their facilities by the Army and the Navy. The latter, in turn, derived benefits from the training provided by these institutions. Accordingly it was desired that recognition of these joint benefits should be reflected in equitable and fair rates.

This new term payment provided compensation for a full term in contrast to monthly payments under the former contract. Other payments, however, not affected by the rate-per-man total, would continue on a monthly basis. Thus in establishing a rate mutually agreeable, contracting institutions were paid in accordance with the number of men in attendance on the tenth day after the start of each term. In the event of attrition or withdrawal from the program during the current term, no refund for the unexpired portions would be required. At the same

time the using services were not willing to assume the responsibility for staff or personnel commitments beyond the current term.

Upon the presentation of these recommendations by the subcommittee the Joint Board recommended the adoption of a revised contract form for all contracts beginning with the fiscal year, July 1, 1944. At this time no activation expenses were allowable in the new contract. A flat rate for instruction immediately went into effect, thus necessitating the termination of all contracts for administrative convenience and the negotiation of new contracts based on the revised form.

Within this rate for instruction were included costs for maintenance and operation and use of facilities of the instructional plant which heretofore had been included in separate articles. The termination of many training units and the creation of smaller units in the ASTP and the announced plan of reduction of the Navy V-12 program forestalled any apprehension with regard to economic operation in the periods ahead. All schools without a known exception welcomed the new basis of payment for instruction which eventually operated to mutual satisfaction. The complicated problem of cost analysis in connection with initial budget preparation was no longer present and this was particularly beneficial to the government in that only final payment audits were required upon termination.

PROFESSIONAL TRAINING PROGRAMS

Up to this point mention of the medical, dental, and veterinary programs has been purposely avoided. This training, while constituting an important phase of the ASTP and V-12 programs, was on an entirely different contractual basis.

In the early months of 1943, when the college training programs were in the process of development, the matter of a basis of payment for professional training was approached with considerable caution and hesitation. It was clear at the outset that the budgeted cost basis of contracting could have no relation to medical instruction. Except for accelerating a continuous instructional program, there was no change in normal operation or academic requirements. Hence the only difference between a service trainee and a civilian student was the uniform,

and the fact that the government was paying for the service trainee, and the parent for the civilian. Accordingly, the basis of normal tuition and fees was adopted with slight modifications as to the fees that were properly chargeable to either the student or the government. In order to equalize the normally high rates charged by privately endowed schools, it was further decided that in state-supported institutions the nonresident fee would be paid, regardless of the residence of a trainee.

Many schools were greatly concerned over the housing and messing of medical students, since few schools were equipped with the necessary facilities. In view of this fact, and to avoid the least possible interference from military housekeeping duties, the Navy was definite in its decision to place all students on a commutation allowance. The Army concurred. The only exception was that where facilities were manifestly available, all such facilities would be utilized. During the entire program only about 20 percent of the medical students were quartered and fed under contract.

Considerable discussion centered on the problem of furnishing the necessary textbooks and instruments required for these courses. This question resolved itself into a final conclusion that the government would provide all textbooks and instruments, and would retain ownership of them. Subsequent developments enabled the students to purchase the textbooks they desired to retain, thus aiding the government in disposing of tremendous quantities of property.

SUMMARY OF STATISTICS

Statistics of the estimated aggregate costs of the major college training programs are condensed in Table 12. This table is by no means representative of all training conducted at colleges and universities.

The Navy Department, in the absence of naval training stations, utilized approximately 90 colleges for special training other than V-12 in technical and administrative fields peculiar to that service. The contractual relations for this type of training, while following a pattern similar to that used for V-12 training, differed in a great many instances in that facilities and

faculties were utilized in varying amounts. Training in specialized fields often required the installation of special equipment and in effect created a naval installation on the college campus with little or no relation to the school itself, except for the utilization of its facilities. A review of the financial aspects of this type of training might well constitute a major study in itself. Consequently Navy statistics shown here will deal only with the V-12 program.

The Army, while conducting the major part of its training in camps and industrial plants, likewise utilized colleges and universities for special training other than through the medium of the ASTP. These special programs were by no means insignificant, yet represent only a small fraction of the training program in relation to the 150,000 ASTP enrollment.

The data presented herein are not final cost figures of all the programs. They are approximations based upon weighted

TABLE 12

ESTIMATED CONTRACT COSTS OF V-12, ASTP, AND AAF COLLEGE TRAINING

Service	Number of Colleges	Period of Operation Included	Number of Man Months	Aggregate Cost
Navy				
V-12	131	July 1943 to July 1946	1,626,738	$134,496,922.36
Medical	74	July 1943 to Feb. 1946	175,970	11,323,669.50
Dental	36	July 1943 to Feb. 1946	50,482	3,310,609.56
Army				
ASTP	195	Apr. 1943 to July 1946	1,165,082	91,406,641.39
Medical	76	May 1943 to June 1946	371,225	27,868,777.73
Dental	39	June 1943 to Aug. 1945	84,797	6,004,297.04
Veterinary	10	June 1943 to Dec. 1944	18,181	1,141,324.34
Army Air Forces				
Aircrew	148	Mar. 1943 to July 1944	857,542	56,064,269.20
Meteorology	27	Aug. 1939 to July 1944	82,793	6,462,258.79
Total	.....	.....	.....	$338,078,769.91*

* The categories within the aggregate are as follows:

Item	*Percentage*
Activation	3.26
Use of facilities	3.97
Instruction	44.25
Medical service	2.22
Subsistence	37.43
Maintenance and operation	8.87
	100.00

averages of per-man-per-month budgeted costs times the number of man months spent in training. Based upon a careful review and study of contractual costs these rates were compiled with a view to presenting the closest approximation in the absence of final cost records. Because the major programs have been only recently terminated, months of work will be required before final payments are made and the end results tabulated. Experience, however, shows small differences between negotiated contracts and actual costs, indicating that estimates were carefully and accurately made and that no major adjustments in final payments were necessary. It is believed that these figures are generally indicative of sound estimates and will be found to be reasonably accurate in relation to final cost.

The following comments should be of assistance in interpreting the rates and figures shown in the tables:

Man months. In order to reduce all figures to a common denominator the "man months" factor was employed. Man months were computed by adding the monthly enrollment figures from enrollment reports of each service, beginning with the date of initial assignments to the last complete month of participation in the program. Thus, not only input, but attrition and graduations will tend to be equalized in the average month.

Weighted averages. Weighted averages were computed by dividing the total dollar cost (budgeted) by the total number of men on which such cost was predicated. It should be borne in mind that "total number of men" has no relation to the "man months" factor in determining weighted averages. These averages were taken from reports compiled during peak enrollment periods, and thus provide a carefully adjusted rate based upon experience over the first year of operation.

In using cost figures for peak enrollment periods, it is realized that most rates will be understated since constant decreases in the size of units over an extended period automatically produced slight increases in per-man rates. Many items of cost were fairly constant regardless of the degree of utilization of a facility or a service.

As a compensating factor to offset these increases the item

messing, which for purposes of this report is based upon a 360-day year, is perhaps overstated. Not all students attended mess every day in the year. Very often between terms and on week ends a percentage of students was allowed furloughs or passes, and being absent from the campus was not considered in the official count upon which meals were prepared and on which payments were made. Absence due to furloughs, passes, or holidays ranged from 20 to 25 days a man during a calendar year.

Total cost. Total costs are derived by multiplying the total "man months" spent in the program by the weighted average "rate per man per month." The variable factors allow considerable latitude in either direction but ultimately resolve themselves into an amazingly equal balance. As proof of this fact, contract estimates on 195 schools were computed as of April 1, 1944, and one year later, final costs on these same contracts covering a period of fourteen months were tabulated, revealing an *actual* cost of $75.75 per man month for recurring items of cost as against the April *estimate* of $75.50.

IMPLICATIONS, IMPACT, AND LESSONS

Reviewing the financial aspects of the college training programs produces mixed emotions as well as arguments in favor of both the government and the institutions. Financial facts can be interpreted as either representing a definite advantage to the school or a worthwhile expenditure in providing skilled personnel for the armed services and for the nation as a whole. Since the schools were to be utilized, it was essential that arrangements should be made to provide payment for their utilization. In this connection responsible representatives of the government earnestly devoted time and energy to developing policies that would guarantee fair and uniform treatment to all contract schools. The wisdom shown in choosing certain features might be questioned, but in the final analysis it cannot be charged that the end result was unilateral in its individual application. To a marked degree the established principles of contract were attained. Because of the high standards set forth by the Army and the Navy, the colleges have become more aware of housing and messing responsibilities.

Analysis of expenses to activate or commission schools for Army and Navy use clearly indicated that for the most part schools were inadequately prepared to meet these requirements. Poor standards of sanitation, preparation of unbalanced menus, waste of food, inefficient buying, slowness in feeding large numbers, poor lighting, poor ventilation, lack of study areas, and fire hazards are among the unsatisfactory conditions found upon inspection by the service officials. In fact, fraternity houses were among those rejected and described as "unfit for human habitation." The lessons learned by the schools are numerous. As a result of Army requirements many colleges can for the first time review accurately their operating costs. In the light of the experiences gained during the war, they are now in a position to adjust their tuition rates, setting a more equitable price on their academic instruction. School officials have become more conscious of classroom space and its maximum utilization, the scheduling of classes, the cost of courses, and a sound over-all realiza tion of economic values in institutional operation.

In the event a similar college training program is undertaken in the future, earnest consideration should be given to the recommendations made by the Joint Army-Navy Board:

1. Experience clearly proves the wisdom of immediate coordination of all uses of colleges and universities by the Federal Government in time of war and that, in such coordinated mechanism, experienced college administrative officers should participate.

2. It is important that the basis of relationships be maintained by contract procedures to protect the colleges against loss and the Government against profit since all collegiate institutions exist in the public interest. At the same time, the contract when drawn and negotiated should leave the colleges autonomous in the administration of their own institutions in order that free education in America shall not be lost during the war emergency.

3. In determining instructional costs and allowances for administrative overhead and use of plant, it is recommended that an analysis of the operations of each contract institution be made and that if possible the provision for overhead allowances and use of facilities be incorporated in some more simple manner such as a percentage of teaching salaries, whenever these are easily and readily obtainable. This would eliminate the arguments in specific situations growing out of the use of such rates as 3 per cent (admittedly low) for overhead and 4 per cent of the book valuation of buildings as a use charge.

4. Such remodeling or improvement of plant as may be required to serve the Federal Government in future training programs should be agreed upon completely at the time the contract is first negotiated and the policy as to the contribution to be made by the Government to match the funds of the institution should be established. It is further felt that the method of disposal of such improvements or property assets giving due consideration to the residual value to the school be determined wherever possible at the time of the original negotiation.

5. It is important, since universities and colleges never have large amounts of working capital cash available, that the using services of the Federal Government be cognizant of the need for making prompt payments under training contracts from the beginning thereof.

6. It is recommended that schools be taken into the confidence of the using services of the Government by promptly publishing the principles and bases upon which contracts will be carried out. Schools and colleges are accustomed to operating in the public interest and are in effect public agencies even in the case of private, tax-exempt, endowed institutions. It is felt that even though some rates of compensation might provide a small gain to the institution, it is to be borne in mind that no individual benefits thereby and that it contributes toward the rendering of a public service.

Perhaps the above recommendations and the ten principles of contract adopted by the Joint Army-Navy Board are the most significant and valuable results of the experience in the wartime college training program of the armed forces. Statistical data and cost records may eventually become obsolete, but these principles and recommendations which are based on fairness, sound judgment, and mutual understanding can always be used. They should be preserved.

X. THE EFFECTS OF WARTIME RESEARCH UPON INSTITUTIONS OF HIGHER LEARNING*

IN THIS altogether too brief examination of but one of the civilian impacts of the war, two questions are presented:

1. Did not the scientific research undertakings, resulting from the national effort to secure a maximum of power for the purposes of the war—both defensive and offensive—operate for the conservation and the training of a relatively large group of younger scientists?

2. Will not the procedures and productivity of the war-induced research tend to the adoption of national policies relative to the organization and financing of research which will exert profound influences upon the research activities and the conduct of graduate study in our colleges, universities, and technical and professional schools?

To some, it will seem that as here stated these questions are in a slanted form. If so, this is not the intention. Certainly the varied, extensive, though incomplete, evidence available tends to sustain affirmative answers to both questions; and to support the statement submitted by one of the nation's foremost scientists, who also directed one of the most important and extensive of the war research programs undertaken by any of our institutions:

> At . . . the war interfered terrifically for four years with our training of research men for industry, which is one, at least, of the big jobs of the technical schools of the country. Because of the fact, however, that they were all in war research, I am not one of those who is inclined to overemphasize, as many do, the loss to the country because of the transfer of so many men from their academic pursuits to military pursuits. *Many of them got a training in research which is just as good as they would have had in the normal course of events in their institutions.*[1]

The war made it clear that *research* and the accompanying *training* of scientific workers were no longer matters of the estab-

* Prepared by Edward C. Elliott, president emeritus, Purdue University.

[1] Italics do not appear in the original statement.

lished self-centered concern of individual laboratories, clinics, or industries. Each of these had a defined place in the scheme for the national mobilization of scientific power. If the large-scale war pattern is to be continued into the period of peace, then it would appear that scientific research is to operate to an increasing extent within the arena of public policy, and, perhaps, of politics, and with the attendant limitations and dangers.

Whatever the prophecy of later outcomes, and without strain of argument, it may be maintained that for higher education of the immediate future, the new complex problem of research, issuing from the war, is already here. Especially critical is that element of the problem having to do with the relation of research to the effective training and education of the new generation of scientists and the teachers of these scientists.

SCOPE AND SOURCES

All of the major agencies of government found it necessary to organize, to conduct, and to stimulate research for the more and more effective performance of duties imposed by warfare. It is far beyond the limits of an initial, exploratory study such as this to attempt to identify and to enumerate the large number of those scientific undertakings which operated within the national research program and which had distinct impacts upon higher educational institutions. It was deemed sufficient to use for purposes of illustration two agencies: the Office of Scientific Research and Development and the Office of Research and Invention of the Navy. The one was of the war, and the other the direct aftermath of the war. A full understanding of the peculiar problems of public policy, science, and education, centering in the wartime research, awaits the time when the entire area of government-induced and -supported research is completely and critically surveyed.

The circumstances of preparation did not include opportunity to give adequate attention to impacts of the war upon medical and industrial research. In particular, it is to be regretted that industrial research could not be considered, for it is already a major influence upon research carried on by higher educational institutions, and as an influence is likely to increase.

The material forming the basis of this chapter was secured chiefly through conference with a considerable number of individuals (named on pages 205–7) whose personal experience with, and direct responsibility for, war research projects qualified them for competent judgments.

Unfortunately, many of the specific key facts relating to research personnel and projects were not available for open use because of security restrictions and the absence of completed records. Nevertheless, the spirit of the testimony, if not the statistics, favors the conclusions presented.

The core of the published evidence relating to the matter is to be found in the notable report of Vannevar Bush, director of the Office of Scientific Research and Development, to the President on a program for postwar scientific research, and published under the title *Science, the Endless Frontier*.[2] Other relevant references are given on pages 211–12.

The series of comments presented in this chapter are by-products of a brief earlier study of the civilian training activities of the armed services and other war agencies made in the fall of 1945 for the Commission on Implications of Armed Services Educational Programs. In the course of this study, the many and extensive scientific research enterprises, carried on in connection with the war, appeared to occupy a not unimportant place in the master design for the training and utilization of civilian personnel. However, the limitations of the study permitted but passing reference to wartime research as related to the higher levels of scientific training. The matter was, therefore, disposed of in more or less summary fashion by the following paragraph, which was included in the section of the study dealing with "emerging problems" of war training.

Scientific Research and Higher Education. Scientific research in all of those fields, from which might come an increase of the war power, was greatly expanded and intensified throughout the war period. The climax of this research was the catastrophic atom bomb. This, it must be remembered, was the dramatic product of the complete national integration of the industry, courage, and genius of civilian scientists and scientific in-

[2] Vannevar Bush, *Science, the Endless Frontier—A Report to the President* (Washington: Government Printing Office, July 1945). See also J. P. Baxter, *Scientists Against Time* (Boston: Little, Brown & Co., 1946).

stitutions, acting chiefly under the leadership of the war agency known as the Office of Scientific Research and Development. The far-flung activities of that Office have left an indelible mark upon the present generation of scientific workers and their laboratories. The current congressional effort to establish the National Science Foundation, with provision for the financing of research and development activities in the facilities of colleges and universities, and with authorization for the award of "scholarships and fellowships to persons for scientific study or scientific work in any field of science, including but not limited to mathematical, physical, biological, and medical sciences, at non-profit institutions of higher education or other institutions . . . may, if successful produce a controlling force for determining the future character of American scientific scholarship.

In no sense does this chapter represent a thorough examination of either the known or the probable effects of the nation's war-produced scientific research activities upon our higher educational institutions. The cessation of hostilities and the defeat of the Axis powers are too recent to enable us with any certainty to interpret the immediate past or forecast the immediate future. Nevertheless, there are wavering signs pointing toward the conclusion that American education, and especially higher education, is to be subjected to new pressures, the transforming effects of which will be greater than ever before in our history. Already it is possible to observe the effects of the provisions of the laws relating to the educational privileges of those who served with the armed services. Of much greater impact are the scope and methods of scientific training and research. These go beyond the individual laboratory, clinic, or industry. They have been brought into the arenas of large-scale organization and of politics. The freedom and financing of scientific advance are more than ever before likely to become entangled in the meshes of controversial public policy. These things must be reckoned with as higher educational institutions begin to cope with the confronting problems of science and scientific manpower. The process of successful reconversion to the new order of things will undoubtedly impose demands for new tactics on the part of educational and scientific leadership.

To an appreciable degree the evidence examined and weighed tends to show one thing. In the presence of the overwhelming demands for manpower on the fighting fronts, and of the re-

strictive provisions of the Selective Service Act, the research work carried on by the armed forces and by other government agencies did enable a considerable number of young men to continue in scientific undertakings, the training value of which may not be discounted. This evidence is meaningful at this time of repeated critical judgments of those concerned with the preservation of the scientific resources and powers of the nation.[3]

WAR, SCIENCE, AND HIGHER EDUCATION

It is scarcely necessary to emphasize or to elaborate here the argument that modern warfare demands the rigorous and concentrated application of modern science to offensive and defensive conflict. Such warfare completely involves all of the productive industries upon which national life depends. Power no longer is to be measured in the simple terms of the numbers of men in the armed forces. High-powered octane is as essential as high-powered ordnance; radar ranks with rations for the maintenance of the battle lines. Psychology and penicillin are necessary materiel. Bacteria are a greater potential menace than bombs; the atom more powerful than the airplane. The logistics of war may not disregard the scientific laboratory.

During the recent past there has been a mounting volume of special and general publications dealing with the new interdependence of war and science and higher technical education.[4] It is beyond the scope of the present enterprise to review the large amount of convincing evidence produced by the war, and which has now become an accepted part of everyday thinking.

The significance of this new situation in its relation to our

[3] Typical of such judgments is that of Herbert Hoover expressed in his address, "Moral and Spiritual Recovery from War," at the 75th anniversary of the founding of Wilson College, October 1945: "The war has brought us a loss in our intellectual life from another direction. In our lists of dead are a multitude who would have given intellectual leadership to our people. Of those who survived, the draft and diversion to war have cost us the equivalent of six annual crops of young men trained in the professions and the arts. I regret to say, that, after the interruptions of war, too small a part of them are returning to colleges for training. Worst of all, by continuing the draft of boys between 18 and 21 since the war has ended we are destroying still another crop. There will sometime be a shortage of scientists, teachers, doctors, engineers, lawyers and our leaders in the humanities. It is not even intelligent of our military forces to continue depriving our future defense of these skills."—*American Scientist,* XXXIV (July 1946), 435.

[4] *The Social Impact of Science: A Select Bibliography.* Report of Senate Subcommittee on the Mobilization of the Committee on Military Affairs, 79th Cong., Subcommittee Monograph No. 3 (Washington: Government Printing Office, 1945).

higher educational and scientific institutions is dramatically illustrated by the following paragraphs from the 1945 report of the president of the Massachusetts Institute of Technology.

Our American way of life is the ever-developing product of the effort and sacrifice of many generations, spanning many countries and centuries, to achieve personal, political, and religious freedom; to build a civilization in which opportunity, security, and a high standard of living shall be available to all under the ethical principles of Christ. We were all too slow in waking up to the threats against these ideals which gathered, like storm clouds, in the 1930's around the Fascists, the Nazis, and the war lords of Japan. After the storm broke, it was only the most cooperative determination to preserve these ideals which saved the world from domination by ambitious powers bent on exploitation and self-aggrandizement which would have plunged the world back into the dark ages.

In this cooperative, all-out effort, our educational institutions have played a notable role. *Whereas the Army and Navy constitute our first line of national defense, I venture the statement that our educational institutions rank with our manufacturing industry and transportation system as the principal supporting lines of military power in time of war and of reserve strength in time of peace. In peace, they educate men for every aspect of our national economy in which higher education is important. In war, they are readymade centers for housing and training officer and specialized personnel; their faculties are the most readily available source of experts for numerous emergency boards, committees, and expanded technical services; their laboratories and staffs become productive centers for research and development on new instrumentalities of offensive and defensive warfare.*

Of this latter aspect I give five of the most significant of some hundreds of illustrations: The most widely used and effective new weapon of this war was radar, which received its principal war development, especially in its microwave version, at the Massachusetts Institute of Technology; the center of development of the devices and methods for rendering the enemies' radar ineffective or its indications misleading was Harvard University; the principal center of development of the important series of rocket weapons was the California Institute of Technology; work on the most important antisubmarine warfare devices was coordinated and organized through contracts with Columbia University; it was scientists from the University of Chicago, the University of California, Columbia University, and other institutions of the United States and Great Britain, who developed the atomic bombs which so dramatically delivered the final blow to end the war.[5]

[5] *Annual Report of the President of the Massachusetts Institute of Technology* 1945, pp. 5–6.

In this connection certain facts may be recalled. The majority of the principal higher educational institutions of the country were direct and active participants in the organized war-training and service activities. Approximately two hundred of these institutions assumed contractual obligations for research undertakings related to the war. Postwar absorptions and pressures have prevented adequate review and evaluation of these undertakings from the standpoint of the institution and of scientific research.[6]

SELECTIVE SERVICE AND THE CONSERVATION OF SCIENTIFIC PERSONNEL

On September 20, 1940, the Selective Training and Service Act of Congress came into operation (Public Law No. 783, 76th Congress). Under this act every male citizen of the United States, and every male alien resident in the United States, between the ages of twenty-one and thirty-six became liable to registration for military training and service. The act was amended in 1942, lowering the minimum age from twenty-one to eighteen.

As a national policy, Congress had declared that "in a free society the obligations and privileges of military training and services should be shared generally in accordance with a fair and just system of selective compulsory military training and service." The application of this policy marked the beginning of a momentous stage in the evolution of the education and training of the youth of the United States.

The Selective Service Act authorized the President, under such rules and regulations as he might prescribe, to provide for the deferment from training and service of any person found, in accordance with Section 10 (*a*) (creating civilian local boards) "to be necessary to the maintenance of public health, safety, or interest," and "of those men whose employment in industry, agriculture, or other occupations or employment, or whose activity in other endeavors is found in accordance with Section

[6] *Effect of Certain War Activities upon Colleges and Universities.* Report from the House Committee on Education, 79th Cong., H. R. 214 (Washington: Government Printing Office, 1945).

10 (*a*) to be necessary to the maintenance of national health, safety, or interest."

The act of 1940 made provision for the deferment of college and university students for the academic year 1940–41. This provision was omitted from the amended act of 1942. Deferments thereafter were subject to individual determination by local boards acting under the rules and regulations of the Selective Service System.

From Pearl Harbor down to the present time, the problem of the effective adaptation of the central principle of the Selective Service Act—the democratic equality of liability for military training and service—to the conservation of the trained scientific personnel, essential for the conduct of war and for underlying industrial production, has remained unsolved. The representatives of civilian industries, of institutions for the basic training of men in science and its applications, and of agencies charged with the growing responsibilities of scientific research showed impatience, and ofttimes resentment toward what appeared to be the shortsighted actions of local and appeal boards. Especially was this true in those situations such as the research laboratories involving men of highly specialized training and superior technical qualifications.

As late as April 1946, the official publication of the American Association for the Advancement of Science contained a significant editorial "Atomic Energy and Atomic Fogs" from which the following excerpt which reveals this spirit was taken:

> Much as we may all hope that the millennium of peace is about to arrive, there is little reason to believe that it is here. Until the signs are more propitious, no American can seriously advocate weakening our military establishment. Unfortunately, however, the military has a flair for weakening itself. It has demonstrated this genius in its relation to science and scientists. During the war both Army and Navy sponsored research of the highest caliber, but the Army displayed absolute indifference to scientific personnel except in the medical field. Students were not permitted to finish, much less to start, scientific training even in essential fields, and it would be difficult to match the flagrant waste of manpower for which the Army through Selective Service must be held accountable. The war is now over, but the Army is still inducting all students in engineering and science, notwithstanding the fact that returning veterans have thus far pro-

vided our schools and colleges of engineering with much less than half of their normal prewar enrollment and our science departments with an even smaller quota of science students. It will take more than a decade, and possibly two, to replenish our scientific personnel if we do something about it now, but the Army has thus far blocked educators from making any progress. Yet a military establishment is only as effective as its technologists make it. Russia in the early stages of the war and China throughout the war demonstrated the futility of manpower without the weapons which science and industry can provide.[7]

The representatives of science who have been, and yet are, sharply critical of the administration of the Selective Service Act and of the practices of the armed forces may well remember that the War Manpower Commission on August 19, 1942, approved a report of a special committee on the utilization of colleges and universities for the purposes of the war. This report contained the following statement:

> . . . All able-bodied male students are destined for the armed forces. The responsibility for determining the specific training for such students is a function of the Army and the Navy.
>
> There is evidence clearly indicative that despite the heavy demands of personnel for the armed forces, a not inconsiderable body of young men was exempted and reserved for scientific work. Nevertheless, it is equally clear in the event of another mobilization of the nation's manpower, that a far better formula will be required for the economical utilization and long-range conservation of the human resources from which the nation's scientific power is developed and maintained.

OFFICE OF SCIENTIFIC RESEARCH AND DEVELOPMENT

The Office of Scientific Research and Development was created within the Office for Emergency Management by Executive Order 8807, dated June 28, 1941, for the purpose of assuring adequate provision for research on scientific and medical problems relating to the national defense.

The functions of the office were to

1. Advise the President with regard to the status of scientific and medical research relating to national defense and the measures necessary to assure continued and increasing progress in this field.
2. Serve as the center for the mobilization of the scientific personnel and resources of the Nation in order to assure maximum utilization of such

[7] American Association for the Advancement of Science, *Bulletin,* V (April 1946), 27–28.

personnel and resources in developing and applying the results of scientific research to defense purposes.

3. Coordinate, aid, and, where desirable, supplement the experimental and other scientific and medical research activities relating to national defense carried on by the Departments of War and Navy and other departments and agencies of the Federal Government.

4. Develop broad and coordinated plans for the conduct of scientific research in the defense program, in collaboration with representatives of the War and Navy Departments; review existing scientific research programs formulated by the Departments of War and Navy and other agencies of the Government, and advise them with respect to the relationship of their proposed activities to the total research program.

5. Initiate and support scientific research on the mechanisms and devices of warfare with the objective of creating, developing, and improving instrumentalities, methods, and materials required for national defense.

6. Initiate and support scientific research on medical problems affecting the national defense.

7. Initiate and support such scientific and medical research as may be requested by the government of any country whose defense the President deems vital to the defense of the United States under the terms of the Act of March 11, 1941, entitled "An Act to Promote the Defense of the United States"; and serve as the central liaison office for the conduct of such scientific and medical research for such countries.

8. Perform such other duties relating to scientific and medical research and development as the President may from time to time assign or delegate to it.

The Office of Scientific Research and Development utilized the laboratories, equipment, and services of government agencies and institutions. The director entered into contracts and agreements with individuals, educational and scientific institutions (including the National Academy of Sciences and the National Research Council), industrial organizations, and other agencies for studies, experimental investigations, and reports.

The director was authorized to carry out the provisions of any contracts which fell within the scope of the Executive Order heretofore entered into by (1) the National Defense Research Committee, established by order of the Council of National Defense on June 27, 1940, (2) the Health and Medical Committee, established by order of the Council of National Defense on September 19, 1940, and (3) the Federal Security Administrator in his capacity as coordinator of health, medical, welfare, nutri-

tion, recreation, and other related activities as authorized by order of the Council of National Defense on November 28, 1940.

The National Defense Research Committee, as well as the Committee on Medical Research, advised and assisted the director in the performance of his scientific research duties, with special reference to the mobilization of the scientific personnel and resources of the nation. To this end it was the responsibility of the NDRC to recommend to the director the need for and character of contracts to be entered into with universities, research institutes, and industrial laboratories for research and development on instrumentalities of warfare to supplement such research and development activities of the War and the Navy Departments. Furthermore, the committee was to submit recommendations to the director with respect to the adequacy, progress, and results of research on scientific problems related to the war program.

SCIENTIFIC RESEARCH PROGRAM OF THE NAVY

A noteworthy and outstanding consequence of wartime research, on a national scale, is to be found in the organization of the Office of Research and Inventions, and the inauguration of a program of peacetime scientific research and development announced by the Navy early in 1946.[8] The distinctive characteristic of this program is that it is to be conducted in cooperation and under contractual arrangements with the educational and technical institutions of the country. It was officially stated that, "The research contract is a new departure for the Navy Department. It is essentially a partnership agreement to conduct research in a sense in which it is understood by most scientists—the creation of new knowledge."

In February of 1946 contracts had been negotiated with thirty of the leading educational institutions of the country, and many others were under consideration. Contracts were also being

[8] The establishment and the beginning of the construction of the new $15 million Naval Ordnance Laboratory at Silver Spring, Md., which is contemplated to be the largest research center of its kind, is a conspicuous example of another agency which in operation will exert an influence upon the research activities, including training, upon a number of educational institutions.

made with commercial laboratories, foundations and other non-educational organizations. By late 1947 approximately one hundred and fifty universities were providing research training for 2,500 graduate students under 700 Navy-sponsored research projects.

At an early stage in the development of the new research program, the Navy publicly announced that particular emphasis was to be placed upon fundamental medical research. Among the fields to be explored were bacteriology, physiology, biochemistry, industrial hygiene, psychiatry, biophysics and radio-biology. And what is more significant is that a reasonable degree of freedom of investigation and publication was provided.

From the point of view of the present chapter, the most important feature of this Navy research program is the emphasis being placed upon training. It is indicated that the ultimate goal is to train men and women who can serve in important scientific fields, for both military and civilian projects. The institutions will be encouraged to integrate the scientific research with their regular educational programs.

SAMPLING THE RECORD

From the beginning the difficulties of securing any complete and evaluated record of the experience of higher educational and technical institutions with the war-induced research programs has been fully recognized. Compelled as they are to be concerned with the multiple tasks incident to the conversion of their institutions to the new peacetime activities, responsible institutional officers have not yet had sufficient opportunity completely to assemble and to assess the consequences of the wartime experiences. Nevertheless, early in March 1946 a special inquiry was sent to a group of institutions selected from among those that had carried on important projects for the Office of Scientific Research and Development and/or some branch of the armed forces.

The pertinent paragraphs of this inquiry read as follows:

> The situation with which I am endeavoring to deal may be described briefly thus: In the course of its activities the Commission on Implications of Armed Services Educational Programs of the American Council

on Education has become convinced of the timeliness of a brief examination of the effects of the extensive wartime research undertakings of the armed forces and of other major governmental agencies—especially the Office of Scientific Research and Development—as these were carried on by and within the colleges, universities, and technical institutions of the country. The direct and indirect influences of these programs upon the staff and students of graduate schools have been noted. This field of inquiry assumes special importance in view of the pending legislation for the establishment of a National Science Foundation.

I have been requested by the Commission to undertake a limited study of the indicated field. It appears that this may be accomplished by securing from a selected list of participating institutions important information upon certain key aspects of the war-produced research programs. The enclosed outline has been prepared after consultation with the representatives of the services charged with the responsibility for the cooperative utilization of the personnel and facilities of our colleges, universities, and technological institutions in the conduct of research activities, and in particular with the representatives of the Office of Scientific Research and Development. This outline is intended to be suggestive of the type of information which is considered to be essential for an understanding of the research situation resulting from the war, a situation probably indicative of a new era for scientific research within all of our principal institutions for graduate study.

The outline referred to in the inquiry contained eleven items which were prefaced by the statement:

What is desired is an over-all statement indicating those conditions and characteristics of war-produced research that promise to have more or less permanent effects upon the institution, with special reference to graduate study and the future supply of trained scientists.

The eleven items suggested for attention in the response were:

1. Indicate, as far as this may be possible and permissible under government regulations, the principal fields in which research was carried on by or at the institution under the general auspices of any branch of the armed services, or of the Office of Scientific Research and Development, or of any other government agency.
2. Approximate number of the members of the permanent staff the major part of whose time and attention was absorbed by this wartime research.
3. Approximate number of the members of the permanent staff granted leave of absence for research service with some branch of the armed forces, or in some other higher educational institution, or in industry.
4. Number of members of the permanent, prewar scientific staff lost to the institution as a result of their participation in the war research programs.

5. Approximate number of younger workers in the institutional research projects who otherwise might have been pursuing their study at a graduate level.

6. Did the conditions of research and the institutional regulations permit any of these younger research workers to utilize the period of research for the partial fulfillment of degree requirements?

7. Extent to which the operation of Selective Service proved to be detrimental to the progress of research of critical importance.

8. Extent to which the institution was enabled to acquire facilities usable for continuing and promoting its future research programs.

9. Tendency of those whose careers of graduate study were interrupted by military service to resume study.

10. Are there any indications that the war experiences will stimulate the support of scientific research—especially fundamental research—within the institution by industry?

11. The general effect of the war research programs upon the institution—finance, personnel, output of students completing graduate study, particularly in fields of natural science.

SUMMARY OF TESTIMONY

The inquiry was sent to twenty-nine institutions. Twenty-five of these institutions made generally complete responses. As might be expected, the analysis of these responses exhibited a wide range of operations and of judgments of values. On the following pages, paragraphs are quoted verbatim from the expressed opinions of the general effect of the war research programs.

EFFECTS ON UNIVERSITY STAFFS AND STUDENTS

The information supplied in response to the questions relative to the staffs, students, and the research programs was as might have been anticipated. Altogether, several hundred members of the staffs and junior assistants of the institutions were engaged in the work of research. While not a few staff losses were reported, the total number is relatively small. Naturally, the war research had a direct impact upon those who, under other conditions, would have been devoting themselves to the usual graduate study and research. Though data are incomplete at certain points, approximately 1,500 of the workers in the war research projects were thus affected.

The great majority of the institutions report special provi-

sions whereby the younger research workers were permitted to utilize the period and subjects of research for the partial fulfillment of degree requirements.

Following are selected replies:

Most of our staff seem to be impressed primarily with the strain of continued work, caused not only by research but also the accelerated teaching program in which most participated, which they experienced during the war years. It brought many out from a somewhat cloistered life and made them more active than they were before and in fields that they would not otherwise have entered.

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Although scientists are returning to their basic research with enthusiasm, they are also realizing how greatly out of touch they became with basic science.

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Perhaps the greatest benefit which they received from their experience has been the confidence obtained in organizing a project, supervising it, and seeing it through to a conclusion. Many never had or would have had this type of experience. In other words, the scientific staff of our educational institutions, even in engineering, has been deficient in industrial experience of the right type. There is evidence of considerable development in the ability of these men, and also in their outlook.

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Considerable sums of money spent on war work. Chief return is a feeling of good job well done.

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The effect on personnel was thought to be salutary. For example, some of the men present thought that they had been given for the first time opportunities which would otherwise have not occurred by reason of lack of funds within the institution. Federal funds permitted them to undertake research along lines that would be of continuing personal interest. There was likewise general agreement that the appetites for research had been whetted by these opportunities and that the whole field of research had to that extent been invigorated.

STIMULATION OF A WIDER OUTLOOK

Particularly the personal ties which were established at such great laboratories as the Radiation Laboratory, the Los Alamos Laboratory, and others, will mean that the physicists at least in this country will be a much

closer-knit group in the future than in the past, for in spite of the fact that the group is much larger, there have been larger groups working intimately together. Through these personal friendships, an extended exchange of ideas and information will take place which will mean less isolation of physicists from each other and more rapid progress due to the stimulation of the exchange of ideas.

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A fine feature of the research carried on during war years was the wider realization by highly specialized individuals of the interdependence of the sciences. Compartmentalization of interests was effectively broken down at many points.

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The enormous additional research programs undertaken have aided us to clarify our thoughts on the function of the university in the whole research picture. While the institution must continue to support actively the research interests of its faculty, particularly those members of the graduate school, it should not need to accommodate separate research institutes within its organization. Research of staff and their assistants is looked upon largely as forming the logical and healthy environment for graduate study and learning.

EDUCATION OF SCIENTISTS

Perhaps the greatest benefit which will accrue to graduate study and research will come from the GI Bill of Rights. Graduate students need subsidy to continue their studies. In effect this is an insurance payment for the future advancement of education. Many young graduates in engineering and science who are taking advantage of their veteran rights to pursue graduate study have been officers in line and have acquired a maturity not possible in any similar peacetime experience. One of the bad experiences in former peacetime graduate education was a tendency to allow self-selection of future staff from men who had continued study because they were too timid to face life competition. It appears that the GI Bill of Rights will supply a larger portion of the highly promising talent for graduate study.

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Generally speaking, war research has resulted in the development of several productive creative staff scholars in the lower age groups. The intensive training of the graduate students under pressure conditions has had a very stabilizing and stimulating effect.

Bad effect on personnel in general. They have become very "practical." They do not have the interest in and the feeling for fundamental science which they had before the war.

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The most serious aspect of the war effort on research undoubtedly has to do with the stoppage in basic training of scientists. It is true that a large number of undergraduate and graduate students participated in war research laboratories and obtained therein an experience of certain value. This, however, is not entirely the equivalent of systematic basic training in science and a large share of these men will now need to spend just as much time in their advanced training as they would have without this war experience. Many of them may in the process be better research men because of this experience, but the fact is that there will be a dearth of young scientists emerging from the graduate schools for some time to come.

POSTPONEMENT OF FLOW OF REPLACEMENTS

The most serious effect of the war research programs has been to reduce the number of students completing graduate study in the fields of natural science. They have provided opportunities for more people to get into research work, the net result being a stimulation of interest in the field. However, the number of fully trained research workers produced during the war has been comparatively small.

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There was general agreement that there had been serious interference in the output of students completing graduate study with the result that there would be a vacuum for many years to come.

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It is probable that under proper conditions, war research programs might have been stimulating to the fields of natural science. The lack of an intelligent program by Selective Service and the Armed Forces effected quite the opposite results. Young and promising scientists were deflected without thought and certainly without plan. As a consequence, not only did research incident to the war effort suffer, but we are now faced with a great hiatus in trained scientists to carry on in the immediate future.

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A definite impetus has been given to the development of research work in this School. We did not suffer financially nor did we lose any appreciable number of staff. There was a definite slow-up and postponement of the production of research workers and there will be a time lag of nearly

five years in producing the number of research workers required in government and industrial services.

EFFECT ON METHODS OF RESEARCH

This gap in the basic research program due to the withdrawal of talent from it during the war will be partly compensated by the fact that many very useful techniques were developed in connection with military and government laboratories which will be of great aid in experimental research.

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As a result of fast-moving research programs in great laboratories, particularly those under OSRD, scientists have acquired a new conception of how research programs might be carried on. In particular, basic research programs will be stimulated, and strengthened, and speeded up if more "service" type of personnel are available in basic research laboratories. That is, scientists have now learned how to use more effectively secretaries, technical assistants, administrative assistants, mechanics, and other personnel to assist in the research program.

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Facilities and other essentials involved in engaging in significant research work were more readily available; problems crystallized rapidly and motivation was intense; graduate students matured and developed more rapidly out of sheer necessity. Graduate students who remained in the usual non-war-connected program of study suffered because of lack of adequate instructional staff but this was a result of the general war situation, and the graduate students in this field were very few.

COMPARATIVE SALARIES

Personnel was temporarily expanded, and now that the shrinking period has come, the temporary gains of such expansion may prove to be more than offset by the difficulties of readjustment or the vastly added costs of supporting workers whose market value, or opinion of their own market value, has been greatly enhanced by the sums and budgets available to them by government agencies during the war.

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The recruiting, developing, and holding of a qualified staff will be vital to the post-war development of fundamental research and graduate study. The biggest threats are the competition from industries, which will expand and develop their research facilities, and the lack of adequately trained personnel of the younger generation during the war period.

The war research program in physics has taken away more personnel than it added. The increased facilities in larger centers make it practically impossible to attract new staff to institutions with limited resources.

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They have withdrawn and are retaining a large group of promising, but partially trained young scientists who are now being paid such large salaries that they are not inclined to give up their positions and return to the University to continue their education. The country has a shortage of well-trained scientists and no additional source of supply is in sight until the colleges can send more men to the universities and the universities can train them. It will require a long time to overcome this deficit of scientific talent—perhaps eight or ten years.

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They have withdrawn many superior members of the staff who are now being offered better salaries and opportunities for research than the University can provide. This depletion of the scientific staff is disastrous to science. The University cannot supply a group of young well-trained scientists unless it retains superior professors on its staff.

FINANCIAL EFFECTS

Because of the no-profit contracts entered into, no institution can be said to have profited or helped itself financially, except to the extent that it has benefited from a fuller use of its facilities, and in some cases through the creation of new facilities and provision for war amortization. It is undoubtedly true that engaging in research helped many institutions through a period which could have been one of grave financial difficulty.

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The War Research programs benefited the institute by absorbing staff members during a period of low enrollment and by helping to carry overhead on some buildings during the war. Only in this indirect manner were these research programs financially profitable.

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It is clear that institutions need assistance in supporting research for more than the direct charges for salaries of helpers and supplies. Donors of funds for research have in the past given generally for the direct costs but have frowned on the assumption of any of the indirect expenses which their very grants have in fact increased. Greatly increased wartime research budgets and the "overhead" principle adopted by OSRD have focused attention on this important subject.

Graduate programs are by no means self-supporting. They need to be subsidized either from endowed funds or contributions from industries. The war experience and the present tax laws not only will make industry more receptive to requests for support, but will promote its taking the initiative in making contributions.

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To date the results have been detrimental. Financial, plant, and staff resources have been-*exhausted.* There is urgent need for rehabilitation of staff, expansion of plant, the extension of support, particularly that available for long-term, fundamental projects, including training. Intermittent support of a specific project on a one-year basis saps rather than replenishes resources of educational institutions.

SELECTIVE SERVICE

The following replies to the question relating to the Selective Service reflect the wide spread of results and reactions:

We lost four excellent scientists because of the arbitrary action of Selective Service, and about 30 per cent of our research assistants.

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As far as can be determined, no individual engaged in critical research, whose contribution could be classed as irreplaceable, was lost through Selective Service.

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Throughout the war it was difficult to obtain scientific personnel and to keep such personnel. Graduate work became practically extinct during the war period. Much more could have been accomplished if research workers had been permitted to pursue research projects.

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Selective Service procedures were continuously detrimental to the progress of research. Through vigorous action it was possible to hold a number of capable young men but a good many did get away during the period of the war years.

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In general we could secure deferment for the staff with which we started; in my recollection as a member of the committee which prepared the institutional replacement schedule, only one man considered essential to the research program was actually drafted. On the other hand it was difficult to obtain additional qualified personnel to expedite the work we

were doing—which was important for war purposes. I think this is why the Engineering Research Department reports that Selective Service, as administered, was "definitely detrimental to the progress of research of critical importance."

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There was complete unanimity among those present that Selective Service was detrimental to the progress of research of critical importance. In some instances Selective Service did not permit deferment of any research workers. In other instances desired expansion in research of critical importance was denied by the absence of adequate manpower. In other instances too much time of the official investigator was required to process deferment applications. In every instance the men present testified that the morale of their younger workers was very low and this impaired efficiency.

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I know there was a lot of "crabbing" but I do not think important projects were really injured.

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We lost no men but several key research executives had to spend from 20 to 50 percent of their time on this battle.

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Only slightly detrimental, in requiring considerable time (including travel time) in order to justify deferment, which might otherwise have been spent in pressing research.

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Regulations were more annoying than detrimental. The continual uncertainty of a man's status was not conducive to the pursuit of research.

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Our experience with Selective Service has been most fortunate, we have lost only one man to the Navy.

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The Selective Service was a continual headache and in case of another war should be modified insofar as scientists are concerned. Our department lost thirty-five men to the armed forces. Some of these had reserve commissions and should have gone to war. A few enlisted but some fifteen were taken who should not have been. Some of these were assigned by the Army to Hanford, Oak Ridge, etc., in other cases they were wasted as scientists and most never saw active combat.

An even more serious matter was the terrific waste of time in sending very numerous letters to the local boards, appeal boards, state directors, etc., and the bad effect on the morale of men who were kept in a continual state of uncertainty over their future. It would have been much better to put these men in uniform and assign them to their research problems.

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The answer is that Selective Service was detrimental only to a very small extent; we have had a high percentage of deferment for essential research personnel, with the assistance of the National Roster and the Office of Scientific Research and Development.

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The Selective Service System in general proved detrimental to the progress of research of critical importance in the following ways: (*a*) Much time and energy of the responsible investigators was consumed in making repeated applications for deferment of assistants. (*b*) Younger research workers had no feeling of security and, as a result, their work suffered. In some cases these men did not feel they were doing all they should in the war effort and left for other work or enlisted. (*c*) It was difficult for project leaders to train new workers or groups of workers when older, more experienced hands were drafted. (*d*) Project leaders had great difficulty in making long-term plans for their work because they could not be sure of the quantity or quality of assistants over any considerable period of time.

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In summary, it may be said that the Selective Service System was more of a nuisance than a real deterrent. Men who were well advanced in their training, i.e., the key assistants, could be retained because they could be classed as specialists. However, it was difficult to hold the younger, less experienced workers for any considerable period of time.

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There were very few individuals under thirty years of age available for research of critical importance. It is difficult to say to what extent this was detrimental to the program. There is no doubt that faster progress could have been made if a better selection of talent had been available and the time necessary to handle deferments had been minimized.

Undoubtedly there was an undue amount of fumbling and muddling in adapting the underlying philosophy of Selective Service—the equality of responsibility for service in the armed forces—to the practical scientific needs of the war. There has

been a disposition in some places to overemphasize the losses. From the above testimony the losses were not as great as many were inclined to maintain.[9]

FIELDS OF RESEARCH

The extent of the replies concerning the fields of research was influenced by two things: the number of war and related agencies that utilized and cooperated with the institutions, and the number of natural sciences that were involved. Among the agencies taking part were: Civil Aeronautics Authority, National Advisory Committee on Aeronautics, National Research Council, Office of Production Research and Development, Office of Scientific Research and Development, United States Engineers Office, Navy Department (Bureau of Ships, Naval Proving Ground, Naval Research Laboratory, Navy Ordnance), War Department (Ordnance, Air Corps), Rubber Reserve Corporation, War Production Board, Quartermaster, Chemical Warfare, Surgeon General, Signal Corps.

An examination of the lists of specific research projects, accumulated from the reports of the institutions, reveals the impressive fact that they included practically the entire range of the natural sciences, from atomic energy to zoology. By reason of the fact that many of the projects are still considered confidential, it is not possible to present the entire list. However, a list from a single institution is illustrative: Soil studies for airports, strength of plastic materials, aeronautical problems, metals at high temperatures, Link trainer, explosives, detection of distant objects, prefabricated housing, milling of alloys, metal fatigue, V-2 fuses, bombsighting, soil stabilization, atomic bomb, celluloid, protection of ships against magnetic mines, spectro-chemical analysis of alloys used in armor plate, translation of foreign documents, inspection of bomb racks, tanks, super chargers,

[9] The Office of Scientific Research and Development reported informally on April 8, 1946, on the basis of an incomplete tabulation, that of 9,794 applications for deferment all but 64 were approved. Two thousand of these were for those ranking as graduate students.

In this connection, the comment of the former director of personnel for the Manhattan Project is pertinent: "General Groves and I both feel that Selective Service cooperated in a very satisfactory manner, particularly when we realize the problems that were faced."

wind tunnel and airports, antimalarials, effect of climate on man, molecular structure of penicillin, secret communications systems, etc.

Here, was an unprecedented array of scientific problems and an equally unprecedented mobilization of men and means for attacking these problems. It is reasonable to conclude that the form and objectives of the attacks for solutions are bound to leave a more or less permanent influence upon the later research of the institutions.

FACILITIES

Reliable information regarding the extent to which the institutions had been able to acquire the special facilities provided for research programs was not available in April 1946. There were numerous instances where it was expected that such facilities would continue to be used. Their disposition awaited the decision of the federal agencies charged with authority and responsibility for the disposition of surplus assets for war.

In this connection two recent developments appear to be most significant. A number of eastern universities have associated themselves into an organization that will take over the facilities of the famous Manhattan Project and continue its research program. A similar organization of midwestern universities is reported for the cooperative operation of the wartime nuclear research facilities.

RESEARCH, WAR, AND GRADUATE STUDY

Only after there is ample opportunity to assess the number and quality of those of war experience—either in research or in the armed forces—who continue their graduate study will it be possible to determine with any certainty the effects of the war upon the human resources for scientific advancement. A considerable majority of the institutions indicate a pronounced tendency of those whose careers as graduate students were interrupted by the war to resume their study. Certain of the typical observations on this point are significant:

Only time will give sufficient data to answer this question correctly and accurately.

Tendency to look for security, if military service was in scientific areas. For these men continued graduate study is dependent upon fellowship or staff grants that compete favorably with industry policies from financial and security point of view.

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The tendency of those whose careers of graduate study were interrupted by military service to resume study is very uncertain. Many are accepting positions in industry. The few that return are not sufficient in number to meet our needs of graduate assistants.

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Some of the men have resumed graduate study, but many are still continuing on government projects because of the draft situation.

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Nearly all of our graduate students whose careers were interrupted by military service wish to resume their graduate studies. Exceptions to this rule include those few who decided to remain in the Armed Services or in some governmental agency, or to accept industrial positions. A better answer to this question may be made next fall. It is still too early to make a final statement.

INDUSTRY AND POSTWAR RESEARCH

Several types of judgment were expressed as to the prospects for increased postwar research cooperation between the industry and the institution. These selected comments are typical:

Research contracts . . . of a fundamental nature . . . will be continued under support of government agencies.

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There are indications that industry will support scientific research to a greater extent than in prewar years. I question whether this can be connected with war experience.

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Yes, but there is still a strong tendency for industry to limit its support to projects that carry promise of rather immediate results through application. There is still too little awareness of the character and importance of basic research. This holds for both industry and government.

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Industry has displayed some additional interest in supporting fundamental research in recent years. This is partially due to the war but it is still true that industry's greatest interest seems to be *applied* research problems.

Answers here are not uniform among the departments. Engineering Research and Pharmacology say yes. Internal Medicine, Chemistry, Physics, Pharmacy, and Public Health say no, I think chiefly because they believe that the industries associated with their fields were already much interested in fundamental research before the war and had supported it.

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There was general agreement that some funds for fundamental research and a good deal of funds for applied research would be forthcoming from industry during the next few years but the majority of those present thought this was due less to industry's desire to finance research than to the ease with which they could do it currently because of the tax structure. The inference of this feeling was that industries generally would probably become very niggardly with research grants when such grants really cost something.

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Achievements of war research and present tax laws have stimulated industry to support scientific research. In general, there are three types of interest: (1) Those who understand what fundamental research is and the function of an educational institution in promoting it, and who are willing to make grants for the general fields of inquiry for indeterminate periods in which free choice of investigation and publication is allowed. (2) Those who are interested in what they believe to be fundamental research pertaining to their own industry, who frequently confuse it with applied research, and who would like to reserve patents and other rights. (3) Smaller industries or associations of them who have limited research and development facilities and who would like to use the educational institutions as their laboratories. Any widespread activities of the latter type, unless specifically provided for by separate industrial research foundations adequately equipped for the purpose, will menace the advancement of sound technical education.

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There are some indications that the war experience will stimulate the supporting of scientific research within the institution by industry, since industry has become more aware of the value of research. Some industrial companies have become more aware of the value of the fundamental research, but it still appears that most of the research opportunities financed in full or in part by industry will have emphasis upon the applied aspects of research.

* * * * *

There has been no marked increase since the war in the support by industrial concerns of scientific research of a fundamental nature. A more definite answer to this question may be given next fall. It is fair to state at this time that we are receiving a very generous support of fundamental

research, and that there are indications of desire on the part of industry to increase its support.

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There is some indication that industries have learned about the importance of research and will give additional support for fellowships, grants-in-aid of research and industrially sponsored research projects. The increasing number of research projects administered by the Research Foundation and the success of the Development Fund in raising money for research projects from industries seem to indicate an awakening of the industries to the importance of research and the necessity for its support.

ACTION AND REACTION

The risk of being too certain as to effects of the war upon those attitudes, aptitudes, and accomplishments of those who were, who are, or who should be vital parts of the nation's scientific power is not a small one. One thing is axiomatic: the need of a calculated and concerted plan for the selection, conservation, training, and utilization of those possessing the characteristics essential for the maintenance of our momentum for scientific advance. The proposal for the establishment of the National Science Foundation is an attempt to provide essential ways and means for meeting this need.[10]

If and when such a foundation comes into existence, it must be looked upon as a direct outcome of the war and as possessing a tremendous potential influence for determining, not only the future progress of scientific research, but the character of the operations of graduate education for science in this country.

Already controversial issues are presented: the feared political control of science and the consequent loss of the fundamentals of freedom of inquiry; the emphasis likely to be placed upon applied, rather than fundamental, research; the absorption of the best of the scientific ability of our colleges and universities in the affairs of research rather than of teaching; and the limiting effects of team or compartmentalized research upon individual creative ability. Withal there is agreement upon one fundamental: the dependence upon the colleges and universities for

[10] S. 1850, 79th Cong., 2d sess. In the House of Representatives, July 5, 1946. This proposal was not acted upon prior to adjournment of the session.

the supply of trained men.[11] The graduate schools may be either the beneficiaries or the victims of the postwar program of higher education and scientific research. It may easily be that, of the many effects of war training upon civilian education, the impact of wartime research will exert the most far-reaching influence.

Since the completion and formulation of this chapter, a number of important steps have been taken in the further development of the program of scientific research for national purposes. Among these may be noted: (1) the establishment in June 1946 of the Joint Research and Development Board as a joint board of the War and Navy Departments for the purpose of coordinating all research and development activities of joint interest; (2) the establishment of the President's Scientific Board[12] "in order to insure that federal research activities contribute most effectively and efficiently to strengthening the national defense, to developing the domestic economy, and to increasing the store of fundamental knowledge"; (3) the work of the Argonne National Laboratory to foster scientific research and discovery in the field of atomic energy under the charter membership of a group of participating midwestern higher educational institutions.

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[11] "We must continue to look to the universities and colleges for our supply of trained men—no other institutions are equipped for this task. There is a great stimulus to both teaching and research to have the two combined. Any purely research organization has a large tendency to become narrowly specialized since it lacks the necessity of reviewing its work continuously from the standpoint of imparting its results to other than already highly trained specialists. The maintenance of our graduate schools at a high level of efficiency is, therefore, a matter of the utmost importance if we as a nation are to maintain leadership in science and derive maximum benefit from what may be in science."—Frank B. Jewett, *American Scientist,* XXXIV (July 1946), 451.

[12] Executive Order 9791, Oct. 17, 1946, *Federal Register,* Oct. 19, 1946, p. 12279.

Institute of Technology; President William E. Wickenden, Case School of Applied Science; Chancellor Robert M. Hutchins and Vice President Emeritus Emery T. Filbey, University of Chicago; President Cloyd H. Marvin, George Washington University; President Henry T. Heald, Illinois Institute of Technology; President Virgil M. Hancher, State University of Iowa; President Isaiah Bowman, Johns Hopkins University; President Karl T. Compton, Vice President James R. Killian, Jr.; and R. M. Kimball, assistant to the president, Massachusetts Institute of Technology; President John A. Hannah and R. C. Huston, dean, Graduate Studies, Michigan State College; President Alexander G. Ruthven and Frank E. Robbins, assistant to the president, University of Michigan; President J. L. Morrill and Vice President W. T. Middlebrook, University of Minnesota; President Franklyn B. Snyder, Dr. J. R. Miller, dean of the Medical School, and Ovid E. Eshback, dean, Institute of Technology, Northwestern University; President Howard L. Bevis, Ohio State University; President R. D. Hetzel and Dean F. C. Whitmore, Pennsylvania State College; Chancellor R. H. Fitzgerald and H. E. Longnecker, dean of research in the natural sciences, University of Pittsburgh; President Harold W. Dodds and Hugh S. Taylor, dean, Graduate School, Princeton University; President Frederick Hovde, Henry B. Hass, and Karl Lark-Horovitz, Purdue University; President Alan Valentine and Lee A. DuBridge, University of Rochester; President D. B. Tresidder, Vice President Alvin C. Eurich, Dean F. E. Terman, Hugh S. Skilling, and Dr. Paul Kirkpatrick, Stanford University; President Harvey N. Davis, and Edwin G. Schneider, assistant to the president for research, Stevens Institute of Technology; President Leonard Carmichael, Tufts College; Chancellor Arthur Compton, Washington University; and President Edwin B. Fred, University of Wisconsin.

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The American Council on Education is a *council* of national educational associations; organizations having related interests; approved universities, colleges, and technological schools; state departments of education; city school systems; selected private secondary schools; and selected educational departments of business and industrial companies. It is a center of cooperation and coordination whose influence has been apparent in the shaping of American educational policies as well as in the formulation of American educational practices during the past thirty years. Many leaders in American education and public life serve on the commissions and committees through which the Council operates.

The Commission on Implications of Armed Services Educational Programs began its work in July 1945. It undertakes to identify features of the wartime training and educational programs worthy of adaptation and experimentation in peacetime civilian education of any and all types and levels. It also undertakes to make available to the public well-considered answers to the questions: What should education in America gain from the experience of the vast wartime training efforts? What are the implications for education and the national culture and strength, now and in the future?